DEPARTMENT OF THE AIR FORCE

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

25 FEB 1994

27 FW/CC
100 S DL Ingram Blvd Suite 100
Cannon AFB NM 88103-5214

FEB 1994

Ms. Barbara Hoditschek
Manager, RCRA Permits Program
Hazardous & Radioactive Materials Bureau
1190 St Francis Drive
P O Box 26110
Santa Fe NM 87502

Dear Ms. Hoditschek

Thank you for your comments and assistance on our Resource Conservation and Recovery Act (RCRA) Subpart X permit application for Melrose Air Force Range (AFR). We feel the meeting between your staff, our environmental office and contractor on February 1, 1994 to discuss these comments was paramount in our successfully completing the necessary revisions.

In response to your comments you will find answers to your specific questions at Attachment 1. We have also included a revised Part A application (Attachment 2). Supporting documentation such as the new Baseline Characterization Sampling and Analysis Plan, the Environmental Soil Monitoring Sampling and Analysis Plan, Contingency Plan, and necessary corrected pages are also attached.

Together, we have set the pace for the Air Force and the nation by working closely on this project. Without your support we could not have accomplished this level of quality. We look forward to working with you to finalize the permit. If you have any questions, please contact Capt Greg Walters at (505) 784-4348.

Sincerely

WILLIAM M. GUTH
Brigadier General, USAF
Commander

Attachments:
1. Revised Part A Application
2. Response to NOD
3. Baseline Sampling Plan
4. Soil Sampling Plan
5. Contingency Plan
6. Correction Pages

1a: There are no specific problems associated with analytical detection of explosive residues, toxic metals, etc resulting from incomplete combustion of reactive wastes. Cannon AFB has rewritten the environmental media monitoring plan (Atch 4) to increase the level of confidence in finding potential contamination. This new monitoring plan will take into account mechanical transport and dilution of contamination.

1b: This new monitoring plan will take into account mechanical transport and dilution of contamination. This includes biasing the sampling strategy to account for wind direction at time of detonation, sampling at depth within the detonation area (Ground Zero), and having additional samples in reserve, should potential transport of contamination extend beyond existing sampling plan boundaries.

2. The methodology and calculation for the revised sampling plan are contained in the plan at Atch 4.

3. Based upon our 1 Feb 94 meeting, we have agreed to conduct additional baseline characterization for the modified Appendix VIII analytes. A Baseline Characterization Sampling and Analysis Plan has been provided for your review (Atch 3). A brief justification for the modified Appendix VIII listing is contained in this plan.

4. Method 8330 cannot be used as an indicator for tracing other compounds. However, the primary indicator of contamination at OD units is metals. Metals also represent the most persistent form of contamination. The "Bang Box Studies" (Johnson 1991 and 1993) indicated semi-volatile organics releases were approximately two orders of magnitude less than metals releases. Since the compounds of Method 8330 are primarily SVOCs, it will provide an indication of SVOC presence for these target items. Baseline sampling will include SVOC analysis. If baseline sampling indicates the presence of SVOCs, we would recommend modifing the routine monitoring plan to replace explosives with SVOCs.

5. Migration potential will be monitored by biasing the sampling plan toward likely avenues of migration (e.g. wind direction, run-off avenues, and depth samples). If contamination is found, the presence and extent of contamination will be confirmed. Details regarding this are contained in the environmental monitoring sampling and analysis plan at Atch 4.

6. The hypothesis for a low migration potential has been complemented with additional data and a stronger soil sampling and analysis plan.

7a. Table C-3 which listed potential waste munitions to be treated has been rewritten to include only those wastes where the treatment standard specified in Air Force Technical Order 11A-1-42 *General Instructions for Disposal of Conventional Munitions* (Part B application AppendixD1-3) is detonation. Those items whose treatment standard specifies burning will not be treated at the OD unit. A revised table C-3 is located in Atch 2 with the revised Part A application and in Atch 6 as correction pages.

7b. Propellants will not be detonated at the OD unit, unless OD is the recommended treatment options. In addition, the "Bang Box Studies" (Johnson, 1991 and 1993) identified the primary indicators of contamination to be metals. Sampling for explosives (EPA 8330) would determine if any whole propellant grains were dispersed during a detonation event. By products from other munition items would be broken down to basic organics, most of which would be vaporized during the detonation because detonation is more relative to intended use.

8. The source of this information was Headquarters Air Combat Command who formulated the listing in conjunction with several munitions manufacturers, US EPA, and the DoD Explosives Safety Board.

9a. Action levels have been calculated for all items with an applicable reference dose (RfD). However, since some background levels are above calculated action levels, the action level has been increased accordingly. The additional baseline sampling will better establish background levels to reconfirm selected action levels.

9b. Remedial action procedures are described in the revised soil sampling and analysis plan.

10a. Present job titles will not change until the reclassification is complete. In order for this to happen the Skill Training Syllabus (STS) is presently under revision. When the STS is released for implementation, the permit data will be updated accordingly. Until this time, old position titles will remain the same.

10b. Sampling and analysis will normally be conducted by a qualified contractor. We have added qualification requirements for contract personnel to have proper 29 CFR 1910 certification and a minimum of 2 years of experience. This has been added to the personnel training section of the part B permit application. The correction page is located at Atch 6.

11 The Melrose AFR contingency plan has been rewritten and is provided at Atch 5.

12. The apparent conflict in delineation of the 100 yr flood plain was because the original drawing by USGS was not properly scaled. Cannon AFB and Radian personnel conducted additional surveys to gain more detail with relation to the flood plain and the location the OD unit. USGS was able to provide more accurate location of the flood plain with this survey data.

13a. References to regional or perched acquifer flow have been corrected.

13b. Quantities of waste explosives have been updated to reflect consistency between the Part A and Part B applications. A revised part A application is provided at Atch 5 to include new commander signatures.

13c. The relationship between potential contamination and chemical analysis from the potable water well have been deleted. The potable water well is screened in the Ogalala acquifer.

2/24/94

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Form Approved. OMB No. 2050-0034 Expires 12-31-91
GSA No. 0246-EPA-OT

For EPA Regional Use Only

Date Received
Month Day Year

EPA

United States Environmental Protection Agency
Washington, DC 20460

Hazardous Waste Permit Application Part A

(Read the Instructions before starting)

For State Use Only

I. ID Number(s)

A. EPA ID Number: NM5572124456

B. Secondary ID Number *(If applicable)*:

II. Name of Facility

MELROSE AIR FORCE RANGE

III. Facility Location *(Physical address not P.O. Box or Route Number)*

A. Street: 6mi West 5mi South

Street (continued):

City or Town: Melrose

State: NM

ZIP Code: 88124-

County Code *(If known)*:

County Name: Curry/Roosevelt

B. Land Type *(enter code)*: F

C. Geographic Location

LATITUDE *(degrees, minutes, & seconds)*: 34 17 03 9

LONGITUDE *(degrees, minutes, & seconds)*: 103 47 01 1

D. Facility Existence Date

Month Day Year: 01 01 194

IV. Facility Mailing Address

Street or P.O. Box: 27 FW/CC 100 DL Ingram Blvd

City or Town: Cannon AFB

State: NM

ZIP Code: 88103-5000

V. Facility Contact *(Person to be contacted regarding waste activities at facility)*

Name *(last)*: OSHITA

(first): BRUCE

Job Title: CHIEF CEV

Phone Number *(area code and number)*: 505-784-4348

VI. Facility Contact Address *(See instructions)*

A. Contact Address Location: ; Mailing: X

B. Street or P.O. Box: 27 CES 111 ENGINEERS WAY

City or Town: CANNON AFB

State: NM

ZIP Code: 88103-5136

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GSA No. 0246-EPA-OT

EPA I.D. Number (enter from page 1): NM5572124456

Secondary ID Number (enter from page 1):

VII. Operator Information (see instructions)

Name of Operator: 27 CIVIL ENGINEER SQUADRON

Street or P.O. Box: 111 ENGINEERS WAY

City or Town: CANNON AFB

State: NM

ZIP Code: 88103-5136

Phone Number (area code and number): 505-784-4348

B. Operator Type: F

C. Change of Operator Indicator: Yes [ ] No [X]

Date Changed: Month Day Year

VIII. Facility Owner (see instructions)

A. Name of Facility's Legal Owner: 27 FIGHTER WING US AIR FORCE

Street or P.O. Box: 100 DL INGRAM BLVD SUITE 100

City or Town: CANNON AFB

State: NM

ZIP Code: 88103-5214

Phone Number (area code and number): 505-784-4348

B. Owner Type: F

C. Change of Owner Indicator: Yes [ ] No [ ]

Date Changed: Month Day Year

IX. SIC Codes (4-digit, in order of significance)

Primary		Secondary	
9711	(description) National Defense	4532	(description) Air Transportation Facility
Secondary		Secondary	
	(description)		(description)

X. Other Environmental Permits (see instructions)

A. Permit Type (enter code)	B. Permit Number	C. Description

EPA I.D. Number (enter from page 1)												Secondary ID Number (enter from page 1)											
N	M	5	5	7	2	1	2	4	4	5	6												

XI. Nature of Business (provide a brief description)

This facility will be utilized for Open Detonation for the demilitarization of munitions, munition related items, and similar reactive items. Items are transported from Cannon AFB to Melrose Range on military vehicles. The operation is conducted as described in the Part B Permit Application Section D.

XII. Process - Codes and Design Capacities

A. PROCESS CODE - *Enter the code from the list of process codes below that best describes each process to be used at the facility. Twelve lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. If a process will be used that is not included in the list of codes below, then describe the process (including its design capacity) in the space provided in Item XIII.*

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 unit.*
2. UNIT OF MEASURE - *For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.*

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

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	DISPOSAL:	
D79	INJECTION WELL	GALLONS; LITERS; GALLONS PER DAY; OR LITERS PER DAY
D80	LANDFILL	ACRE-FEET OR HECTARE-METER
D81	LAND APPLICATION	ACRES OR HECTARES
D82	OCEAN DISPOSAL	GALLONS PER DAY OR LITERS PER DAY
D83	SURFACE IMPOUNDMENT	GALLONS OR LITERS
	STORAGE:	
S01	CONTAINER (barrel, drum, etc.)	GALLONS OR LITERS
S02	TANK	GALLONS OR LITERS
S03	WASTE PILE	CUBIC YARDS OR CUBIC METERS
S04	SURFACE IMPOUNDMENT	GALLONS OR LITERS
	TREATMENT:	
T01	TANK	GALLONS PER DAY OR LITERS PER DAY
T02	SURFACE IMPOUNDMENT	GALLONS PER DAY OR LITERS PER DAY
T03	INCINERATOR	SHORT TONS PER HOUR; METRIC TONS PER HOUR; GALLONS PER HOUR; LITERS PER HOUR; OR BTU'S PER HOUR
T04	OTHER TREATMENT (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundment or incinerators. Describe the processes in the space provided in Item XIII.)	GALLONS PER DAY; LITERS PER DAY; POUNDS PER HOUR; SHORT TONS PER HOUR; KILOGRAMS PER HOUR; METRIC TONS PER DAY; METRIC TONS PER HOUR; OR SHORT TONS PER DAY

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
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
CUBIC YARDS	Y
CUBIC METERS	C
ACRES	B
ACRE-FEET	A
HECTARES	Q
HECTARE-METER	F
BTU's PER HOUR	K

EPA I.D. Number (enter from page 1): N M 5 5 7 2 1 2 4 4 5 6

Secondary ID Number (enter from page 1):

XII. Process - Codes and Design Capacities (continued)

EXAMPLE FOR COMPLETING ITEM XII (shown in line numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

Line Number	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	C. PROCESS TOTAL NUMBER OF UNITS	FOR OFFICIAL USE ONLY
X 1	S 0 2	600	G	0 0 2	
X 2	T 0 3	20	E	0 0 1	
1	T 0 4	1000*	J	0 0 1	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12		* See Comments			

NOTE: If you need to list more than 12 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 additional treatment processes in Item XIII.

XIII. Additional Treatment Processes (follow instructions from Item XII)

Line Number (enter numbers in sequence with Item XII)	A. PROCESS CODE	B. TREATMENT PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. TREATMENT PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	C. PROCESS TOTAL NUMBER OF UNITS	D. DESCRIPTION OF PROCESS
					Munition items (wastes) are detonated in a bermed area utilizing plastic explosive as an initiator (See Section D for more detail)
0 1	T 0 4	1000	J	0 0 1	
					* See comments
	T 0 4				
	T 0 4				
	T 0 4				

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EPA I.D. Number (enter from page 1)												Secondary ID Number (enter from page 1)													
N	M	5	5	7	2	1	2	4	4	5	6														

XIV. Description of Hazardous Wastes

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 Item XII A. on page 3 to indicate how the waste will be stored, treated, and/or disposed of 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 Item XII A. 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 processes 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 XIV-D(I).*
   3. *Enter in the space provided on page 7, Item XIV-E, the line number and the additional code(s).*

2. **PROCESS DESCRIPTION:** *If a code is not listed for a process that will be used, describe the process in the space provided on the form (D.(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 XIV (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 operation. 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 HAZARD WASTE NO. (enter code)				B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESS (1) PROCESS CODES (enter)									D. PROCESS (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

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EPA I.D. Number (enter from page 1)												Facility's ID Number (enter from page 1)											
N	M	5	5	7	2	1	2	4	4	5	6												

XIV. Description of Hazardous Wastes (continued)

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)									(2) PROCESS DESCRIPTION (if a code is not entered in D(1))
	1	D003	8000	P	T04									See Atch listing and in
	2													Section C
	3													
	4													
	5													
	6													
	7													
	8													
	9													
1	0													
1	1													
1	2													
1	3													
1	4													
1	5													
1	6													
1	7													
1	8													
1	9													
2	0													
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2	7													
2	8													
2	9													
3	0													
3	1													
3	2													
3	3													

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EPA I.D. Number (enter from page 1)												Secondary ID Number (enter from page 1)											
N	M	5	5	7	2	1	2	4	4	5	6												

XIV. Description of Hazardous Waste (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 6.

Line Number	Additional Process Codes (enter)

XV. Map

Attach to this application a topographic 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.

XVI. Facility Drawing

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

XVII. Photographs

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).

XVIII. Certification(s)

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 be 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.

Owner Signature: William M Guth — Date Signed: 24 Feb 94

Name and Official Title *(type or print)*
WILLIAM M. GUTH, Brigadier General, USAF Commander, 27th Fighter Wing

Operator Signature: J R Strasler — Date Signed: 24 Feb 94

Name and Official Title *(type or print)*
JAMES E. STRASLER, Major, USAF Commander, 27th Civil Engineer Squadron

XIX. Comments

* Munitions items are handled in pounds Net Explosive Weight (NEW)

Design Capacity: 8 ea 1000 lb (NEW) detonations in an 8 hour day

8 X 1000 lb (NEW)/8 hr = 1000 lb/hr *This is a maximum design capacity.

Note: Mail completed form to the appropriate EPA Regional or State Office. (refer to instructions for more information)

Spill Prevention and Response Plan

Plan 106

Melrose Air Force Range, New Mexico

February 1994

Prepared for
27 CES/CEV
Cannon Air Force Base, NM 88103

Prepared by
Radian Corporation
120 South Jefferson Circle
Oak Ridge, Tennessee 37830

DISTRIBUTION STATEMENT

Distribution Limited to U.S. Government Agencies only to protect technical or operational data or information from automatic dissemination under the International Exchange Program or by other means. Other requests for this document must be referred to HQ Air Combat Command/CEV, Langley Air Force Base, VA, 23665.

FROM: _____ DATE: _____

SUBJECT: Distribution of Melrose AFR Plan 106, 22 February 1994

TO: See Distribution

1. This office is in possession of _____ copy(s) of subject plan.

2. Request distribution be changed as follows:

___ Exclude from distribution.

___ Increase number of copies to ____.

___ Decrease number of copies to ____.

___ Change office symbol and/or address as follows:

OLD OFFICE SYMBOL/ADDRESS:

NEW OFFICE SYMBOL/ADDRESS:

3. ___ Above changes apply to this plan only.

4. ___ Above changes apply to all plans distributed by your office.

5. REMARKS:

_____

(Signature of Commander or Authorized Representative)

_____

(Unit/Office Symbol/Phone Number)

Note: Complete and return this form to 27 CES/CEV only if distribution is incorrect.

Melrose AFR Plan 106
SECURITY INSTRUCTIONS

1. The long title of this document is Spill Prevention and Response (SPR) Plan. The title is unclassified.

2. This document is unclassified and requires no special handling or control measures.

3. As this plan is unclassified, it does not come within the scope of directives governing the protection of information affecting national security as specified in Air Force Directives in the 205 series.

4. This plan will be distributed to those organizations shown on the Distribution List, Section X. The plan will be controlled in accordance with established USAF procedures for unclassified documents.

5. Tasked organizations are authorized to extract and reproduce those portions of this document essential in the accomplishment of necessary planning and in the preparation of supporting documents.

Melrose AFR Plan 106
RECORD OF CHANGES AND ANNUAL REVIEW

RECORD OF CHANGES:

CHANGE NUMBER	DATE	DATE OF ENTRY	SIGNATURE AND ORG. OF INDIVIDUAL POSTING ENTRY

RECORD OF REVIEW:

REVIEWED BY	ORGANIZATION	DATE REVIEWED	REMARKS

Melrose AFR Plan 106
PLAN SUMMARY

1. Purpose. This plan provides guidance and assigns responsibility for the prevention and proper response to spills of oils, sewage, or hazardous substances. This plan was prepared and formatted in accordance with Air Force Engineering and Services Center's Guidance Manual for Preparation of Spill Prevention and Response Plans. This plan outlines the procedures for the Melrose AFR to comply with federal, state, and local environmental laws and regulations.

2. Conditions of Execution.

   a. This plan will be effective for execution upon discovery of an oil or hazardous substance spill.

   b. The plan will be executed in accordance with Chapter 3, "Plan Execution," for the general procedures and Annex I for site-specific situations.

3. Operations to be Conducted.

   a. Forces Assigned. Melrose AFR- and/or Cannon AFB-assigned personnel.

   b. Supporting Plans/Orders

      (1) This plan may be implemented in conjunction with Cannon AFB Operations Plan 355-1, Cannon AFB Disaster Preparedness Operations Plan.

      (2) Agencies handling oils, sewage or hazardous substances will develop a checklist for initial notification in accordance with Phase I, Spill Discovery and Initial Notification.

      (3) Key Assumption. Required personnel will be available.

      (4) Operational Constraints. Federal, state, and local laws and regulations on the handling of oil, sewage, and hazardous substances.

      (5) Command Relationships. 27 SPTG/CEV is the Office of Primary Responsibility (OPR) for the plan and will request support through the Environmental Protection Committee.

      (6) Logistic Appraisal. This plan is logistically feasible.

      (7) Personnel Appraisal. This plan is supportable with current resources.

LIST OF ACRONYMS

ACC	Air Combat Command
AFB	Air Force Base
AFESC	Air Force Engineering Service Center
AFR	Air Force Range
BCE	Melrose AFR Civil Engineer
CE	Civil Engineering
CECC	Civil Engineering Control Center
CECT	Civil Engineering Cleanup Team
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEV	27th Civil Engineering Squadron/Environmental Management Flight
CFR	Code of Federal Regulations
CHEMTREC	Chemical Transportation Emergency Center
CHRIS	Chemical Hazardous Response Information System
CRT	Cleanup and Recovery Team
CWA	Clean Water Act
DCCP	Disaster Casualty Control Plan
DCG	Disaster Control Group
DoD	U.S. Department of Defense
DRMO	Defense Reutilization and Marketing Office
DSN	Defense Switching Network
EOD	Explosive Ordnance Detachment
EPA	Environmental Protection Agency
EPC	Environmental Protection Committee
ETIS	Environmental Technical Information System
HAZMAT	Hazardous Materials
HMIS	Hazardous Material Information System
HQ	Headquarters
HW	Hazardous Wastes
IRP	Installation Restoration Program
MSDS	Material Safety Data Sheet
NMED	New Mexico Environmental Department
NOSC	National On-Scene Coordinator
NRC	National Response Center
NSN	National Stock Number
OEHL	Occupational and Environmental Health Laboratory
OHMTADS	Oil and Hazardous Materials Technical Assistance Database System
OHSPC	Oil and Hazardous Substance Pollution Contingency
OPLAN	Operations Plan
OPR	Office of Primary Responsibility

LIST OF ACRONYMS - Continued

OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
POL	Petroleum, Oil, and Lubricants
RCRA	Resource Conservation and Recovery Act
RQ	Reportable Quantity
RRT	Regional Response Team
SPR	Spill Prevention and Response
SPTG	Support Group
UOCP	Used Oil Collection Point
USAF	United States Air Force
USCG	United States Coast Guard

Melrose AFR Plan 106
TABLE OF CONTENTS

Contents Page

TABLE OF CONTENTS (Continued)

Melrose AFR Plan 106
Quick Reference Table

This table should be used as a quick reference listing when responding to a spill. The first response should be to determine the substance spilled and whether it is hazardous. This listing contains the most common hazardous substances and their associated National Stock Numbers (NSNs) used at Melrose Air Force Range (AFR) and the reportable quantity of that substance.

Quick Reference Chemical Listing

Substance	RQ
Aboveground Storage Tank, Leaking	1 lb
Antifreeze (Hazardous)	5000 lb
Diesel Fuel	25 gal
Engine Oil	25 gal
Gasoline	25 gal
Hydrazine	any amount
Hydraulic fluid	1 lb
JP-4	25 gal
Lubricant oils	25 gal
Listed Hazardous Substances (Listing in Section I)	Varies
Paint Waste - Thinners	100 lb
Sulfuric Acid	100 lb
Synthetic Oils	25 gal
Used Paint Rags	100 lb

27TH FIGHTER WING (ACC)
MELROSE AIR FORCE RANGE
NEW MEXICO 88103-5000
25 FEBRUARY 1993

CHAPTER 1 - BACKGROUND

1.1 PURPOSE

This Spill Prevention and Response (SPR) Plan is intended to fulfill the requirements of an Oil and Hazardous Substance Pollution Contingency (OHSPC) Plan and the hazardous waste spill prevention and response requirements. The Contingency Plan portion of the document specifies procedures to be followed when responding to releases, accidents, and spills involving oils, sewage, or hazardous substances. These include spill detection, reporting, containment, cleanup, and disposal procedures. The plan should be implemented in conjunction with the Cannon Air Force Base (AFB) Disaster Preparedness OPLAN, 355-1, if circumstances warrant implementation of the OPLAN. Also included within this document are general procedures for training programs and procedures for plan reviews and updates. The SPR Plan is supported by several vital annexes that provide the specific information associated with the facilities found on Cannon AFB.

1.2 AUTHORITY

This plan was developed in accordance with applicable legislation/regulations. The major federal oil and hazardous substances spill prevention and response legislation and regulations are as follows:

Clean Water Act (CWA), PL 92-500, 33 USC 1251 as amended by PL 95-217 and PL 95-576. Effective date 1977. The CWA authorizes the President to issue regulations establishing procedures, methods, equipment, and other requirements to prevent discharges of oil and hazardous substances from onshore and offshore facilities, and to contain such discharges.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), PL 96-510, 42 USC 9601. Effective date 11 December 1980. CERCLA provides for spill reporting, liability compensation, cleanup, and emergency response for hazardous substances (excluding oil) released into the environment and the cleanup of inactive disposal sites.

Resource Conservation and Recovery Act (RCRA), PL 94-580, 42 USC 6901. Effective date 21 October 1976. Subtitle C of the Solid Waste Disposal Act, as amended by RCRA, directs the Environmental Protection Agency to promulgate regulations establishing a federal hazardous waste management system.

33 Code of Federal Regulations (CFR) Part 153, Control of Pollution by Oil and Hazardous Substances, Discharge Removal. Effective date 26 April 1976. Requires the notification of the Duty Officer, National Response Center, U.S. Coast Guard (USCG) of the discharge of oil or a hazardous substance from a facility in violation of section 311(b)(3 of the CQA).

40 CFR Part 110, Environmental Protection Agency Regulations on Discharge of Oil. Effective date 11 November 1976. Defines a reportable spill of oil.

40 CFR Part 117, Determination of Reportable Quantities for Hazardous Substances. Effective date 28 September 1979. Defines reportable spill quantities for substances designated under section 311 of the CWA and requires notification of the National Response Center in the event of a reportable spill.

40 CFR Part 151, Hazardous Substance Pollution Prevention for Facilities Subject to Permitting Requirements. Proposed regulation 1 September 1978. Requires the preparation and implementation of a Spill Prevention Control and Countermeasures plan to prevent discharge of CWA Section 311 hazardous substances by any facility subject to permitting requirements under the National Pollutant Discharge Elimination System.

40 CFR Part 264, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities. Effective date 19 May 1980. Established requirements under Section 3004 of RCRA for owners and operators of facilities that treat, store, and dispose of hazardous waste. Requirements include preparedness and prevention of hazards, contingency planning, emergency procedures, manifests, recordkeeping, reporting, security, inspection of facilities, and personnel training.

40 CFR Part 300, National Oil and Hazardous Substance Pollution Contingency Plan. effective date 16 July 1982. Provides for coordinated federal action to try to prevent discharges of oil and hazardous substances, and to protect the environment from damage when discharges occur. The plan also requires federal local contingency plans for federal installations and promotes federal-state coordination.

1.3 APPLICABLE DEFINITIONS

Cleanup and Recovery Team (CRT) -- A team of predesignated individuals at Melrose Air Force Range (AFR) and stationed at Cannon AFB, trained and equipped to specifically clean up spills. The CRT is currently composed of members of the Cannon AFB Civil Engineering Squadron.

Environment -- Means the navigable waters, water of the contiguous zone, and any other surface water, groundwater, drinking water supply, land surface, and subsurface strata, or ambient air under the jurisdiction of the United States.

Hazardous Material -- Any material which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may pose a substantial hazard of any release to the environment.

Hazardous Material Response Team -- A team of predesignated individuals at each AFB and AFR, trained and equipped to execute operations for the response, control, and containment of hazardous substance spills.

Hazardous Substance -- Hazardous material or hazardous waste designated as hazardous under Section 101(14) of CERCLA. A comprehensive list of CERCLA regulated hazardous waste that may be present at Melrose AFR is presented on the Quick Reference Chemical Listing on page iv of the SPR Plan.

Hazardous Waste - Any solid, semisolid, or contained gaseous for disposal as defined or identified in 40 CFR Part 261.

The definition is not accurate except for the citation

Release/Spill -- Synonymous terms as defined by section 101('Haz Waste' the intentional or accidental loss, including any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of a hazardous substance into the environment. It includes the release of any material of any size, nature, and quantity that:

(1) Occurs in or endangers critical water areas;

(2) Generates public interests;

(3) Becomes the focus of an enforcement action; or

(4) In any way poses a real or potential threat to public health or welfare, or the environment.

Reportable Quantity -- The quantity designated for each of 699 hazardous substances in 40 CFR 302, under the provisions of section 102 of the CERCLA. These spill quantities are for any 24-hour period and include spills on land and in air in addition to spills in the water.

Spills typically may occur in the work place and are cleaned up without a threat to the environment, public health, and property.

Response Personnel -- Those predesignated personnel charged with being knowledgeable of the nature of hazardous material present in their work places and storage areas. These personnel will also be knowledgeable on spill containment and the cleanup of operational type spills, site layout (e.g., material locations and spill equipment), and use of the site plan.

CHAPTER 2 - RESPONSE ORGANIZATIONS

2.1 GENERAL SPILL RESPONSE ACTIVITIES

The Cannon AFB On-Scene Coordinator (OSC) has available all base resources in determining and performing response actions in the event of an oil or hazardous substance spill. Deployment of personnel and resources will be activated only if called by the OSC, the OSC's representatives on-scene, or the Base Commanding Officer. For spills beyond the capabilities of Melrose AFR and Cannon AFB, additional emergency services can be obtained from the state of New Mexico or contractors or through the U.S. Environmental Protection Agency (EPA) Regional Response Team (RRT).

2.2 BASE SPILL RESPONSE CENTER

The Cannon AFB Fire Department receives all initial spill reports from Melrose AFR. The Fire Department operates 24-hr/day and alerts/activates the Melrose AFR SPR Plan. The Fire Department also notifies the Base Command Post, who in turn passes the report up the chain of command.

2.3 ORGANIZATIONAL FUNCTIONS

Spill response organizations consist of representatives from various squadrons and basewide functions.

2.3.1 Environmental Protection Committee

The Base Environmental Protection Committee is responsible for reviewing the SPR Plan before its promulgation by the Installation Commander and before finalization of any

modifications occurring during the annual review and update of the plan. The committee will develop pollution abatement policy guidance, monitor implementation of this plan and other pollution abatement directives, and ensure that supporting procedures by responsible commanders are published.

2.3.2 On-Scene Coordinator (OSC)

The OSC is the individual assigned the responsibility for directing and coordinating all spill response actions for U.S. Air Force (USAF) spills (see Executive Order 12316). The OSC will have the authority to use the expertise and resources of the HAZMAT Team and Disaster Control Group (DCG) in determining and performing response actions. It is also the responsibility of the OSC to ensure that training programs regarding spill response activities are routinely conducted. The OSC will ensure only certified and trained personnel perform spill containment, recovery, cleanup, disposal, and restoration activities.

The primary OSC for spills of oil and hazardous substances at Melrose AFR will be the Commander, 27 Support Group (27 SPTG/CC). 27 SPTG/CC may appoint someone as OSC according to OPLAN 355-1. The alternate OSC will assume full responsibility in the absence of the primary OSC.

2.3.3 Disaster Control Group (DCG)

Members notified by the DCG (under the responsibility of the 27 FW Command Post) are tasked to respond to all spills when requested by the OSC and to provide services for spill containment, recovery, cleanup, disposal, and restoration activities as directed by the OSC.

The personnel on the DCG and their designated responsibilities are discussed below.

2.3.3.1 Commander 27 SPTG

The Commander 27 SPTG will:

(1) Act as primary OSC responsible for directing and coordinating all spill response actions.

(2) Implement Cannon AFB OPLAN 355-1, if deemed necessary.

(3) Properly report and document oil or hazardous substance spills. Authorize and coordinate with higher headquarters all required notifications and requests for assistance to federal (outside the USAF), state, or local agencies and the news media.

(4) Appoint first alternate OSC according to OPLAN 355-1 Chain of Command.

2.3.3.2 Base Civil Engineer

The Base Civil Engineer (BCE) (27 SPTG/CE) will:

(1) Provide Environmental personnel to furnish technical expertise relative to pollution control techniques.

(2) Within his capability, provide personnel, transportation and equipment for containment, cleanup, and restoration of landscape due to spills of oils and hazardous substances that exceed the capability of the Base agency responsible for the spill.

(3) Notify the Commander 27 SPTG of personnel and equipment requirements that exceed Base capability.

(4) Ensure that adequate types and quantities of spill response and protective equipment, sandbags, absorbent material, cleanup equipment, etc., are stocked as designated in this plan, and that such gear is properly inspected, operated, and maintained.

(5) Provide suitable inventory and storage for chemical agents, absorbent materials, and equipment not otherwise specified to be furnished by other units employed in combating pollution.

2.3.3.3 Base Fire Chief

The Base Fire Chief (27 SPTG/CEF) will:

(1) Act as the OSC until the Commander 27 SPTG or designee arrives at the spill scene.

(2) Direct Fire Department to record all spill reports received from the Emergency Call Line (911) on a designated telephone log.

(3) Immediately respond to spills as necessary to protect life and property with due regard for the environment.

(4) Direct emergency dispatch operator to notify Base Hospital if injuries are reported.

(5) Provide technical assistance to the OSC concerning response to and handling of combustible or flammable substances.

(6) Direct emergency dispatch operator to notify the Environmental Flight on spill occurrences, if necessary.

(7) Measure explosive concentrations and determine if an explosive hazard exists. This information will be provided to the OSC for use in establishing the cordon.

(8) Provide trained personnel, transportation, and equipment for containment of spills of hazardous chemicals where special protection equipment is required (i.e., self-contained breathing systems, corrosive resistant clothing, etc.) This team shall be called the Fire Department HAZMAT Team (HAZMAT Team). Training of the HAZMAT Team members shall include the 24-Hour HAZMAT First Responder course.

(9) Maintain a current list of all members of the HAZMAT Team along with their duty telephone numbers as well as nonduty telephone numbers.

(10) Contact the HAZMAT Team members and inform them to assemble at a designated area as soon as possible.

(11) Evaluate and identify the spill area and determine whether health hazards have been eliminated.

(12) Direct emergency dispatch operator to notify Security Police of spill occurrence if evacuation is required.

(13) Notify the Chief of Operations when the Civil Engineering Cleanup Team (CECT) is needed for containment and cleanup.

(14) Fully equip, train, and maintain HAZMAT Team members to provide initial control, emergency rescue, and hazard mitigation at the scene of a hazardous spill.

2.3.3.4 Chief, Environmental Management

The Chief, Environmental Management (27 SPTG/CEV) and assigned staff will:

(1) Respond to all spill emergency calls. Provide technical and scientific support to the OSC in environmental pollution matters during all oil or hazardous substance incidents.

(2) Advise the OSC as to the need to, or in his/her absence, activate specific members of the HAZMAT Team and the CECT.

(3) Determine the adequacy of the ultimate cleanup effort and advise the OSC of any additional cleanup requirements.

(4) Represent the commanding officer in matters of coordination between Melrose AFR and federal/state agencies exercising jurisdiction in environmental pollution control.

(5) Ensure proper containerization and disposal of all hazardous wastes resulting from the spill.

(6) Maintain official records and photographs documenting the extent of the spill and all contaminants, cleanup and recovery actions taken, and procedures used.

(7) Report to the scene of the spill immediately upon notification, as ordered by the OSC.

(8) Provide technical expertise on severity of spill, containment, and remediation.

(9) Assess environmental impact.

(10) Notify the state of New Mexico, the New Mexico Emergency Response Center (through the New Mexico State Police and in accordance with Chapter 3 and OPLAN 355-1), the National Response Center (NRC), and Air Combat Command (ACC) of reportable spills. Submit pollution incident reports.

(11) Ensure proper cleanup and disposal of contaminated materials.

(12) Notify Base Bioenvironmental Engineer of spill and materials that require testing.

2.3.3.5 Bioenvironmental Engineer

The Bioenvironmental Engineer (27 MG/SPB) will:

(1) Upon notification of a spill, and at the direction of the OSC, sample and test the affected waterways to monitor the extent and degree of pollution caused by the spill, if any.

(2) Provide the technical assistance and advice to the OSC and the hospital with respect to the health hazards associated with oils and hazardous substances.

(3) Perform confirmation sampling after cleanup activities to ensure that hazardous constituents have been removed.

2.3.3.6 Readiness Officer

The Readiness Officer (27 SPTG/CEAD) will

(1) Ensure that the Cannon AFB Disaster Preparedness OPLAN 355-1 is coordinated with the SPR Plan in the event of a hazardous substance spill requiring the implementation of the Disaster Preparedness OPLAN 355-1.

2.3.3.7 Chief, Security Police

The Chief of Security Police (27 FW/SP) will:

(1) Immediately mobilize his or her organization to an actual or potential oil, sewage or hazardous substance spill, to isolate the spill area and control traffic when and where necessary as directed by the OSC.

(2) Ensure that while individuals in the security force are on normal patrols, they are continuously aware of oil and hazardous substance spills and report all areas that appear to be suspect.

2.3.3.8 Liquids Fuels Maintenance Technician

The Liquid Fuels Maintenance Technician will:

(1) Report to the scene, at the request of the OSC, to measure explosive vapor concentrations and determine where explosion hazards exist. This information will be provided to the OSC for use in establishing the cordon.

2.3.3.9 Staff Judge Advocate

The Staff Judge Advocate will:

(1) Respond to all oil and hazardous substance pollution spills, at the request of the OSC, to ensure that information, records, and samples adequate for legal purposes are obtained and safeguarded for future use.

(2) Advise the OSC on the legal aspects of spill response when parties other than the USAF are responsible for the spill.

(3) Obtain necessary permission from land owners to investigate and clean up spills.

2.3.3.10 Public Affairs Officer

The Public Affairs Officer will:

(1) Respond to all oil or hazardous substance spills when requested by the OSC.

(2) Keep abreast of all Melrose AFR actions during a spill and prepare to provide prompt and accurate news releases on the nature of the discharge and the steps being taken to correct the problem. This policy must be followed to obtain understanding from the public, ensure cooperation from all interested parties, and check the spread of misinformation.

(3) Coordinate all news media releases involving actions with the Wing Commander.

(4) If the Regional Response Team News Office is activated, coordinate all news releases with them. If a Regional Response Team News Office is not activated, the EPA's Public Information Office can be contacted (404-881-3004) if deemed appropriate.

(5) Prepare and direct a public awareness program to inform all personnel assigned to Melrose AFR (military, civilian, and contractor) about spill prevention programs as well as spill discovery and notification responsibilities and procedures.

2.3.3.11 Safety Officer

The Safety Officer will:

(1) Provide technical assistance to the OSC with respect to the safety of personnel.

2.3.3.12 Base Hospital Commander

The Base Hospital Commander (27 MG/CC) will:

(1) Ensure that medical personnel and ambulance(s) are dispatched to the site of the spill as directed.

(2) Ensure that emergency treatment is rendered and injured personnel are removed to the Base Hospital for treatment.

(3) Ensure that current and follow-up information on injured personnel is provided to the OSC as soon as possible.

(4) Ensure that hospital staff are familiar with health effects of hazardous substances present at Melrose AFR.

(5) Implement, if required, the 27 Medical Group Disaster Casualty Control Plan (DCCP) to ensure prompt admittance of the injured for treatment (this includes strict control measures to prevent risks of hazards to hospital personnel and the public).

2.3.3.13 Transportation Officer

The Transportation Officer will:

(1) Provide OSC with transportation as required for spill response personnel and equipment.

2.3.3.14 Weather Officer

The Base Weather Officer will:

(1) Ensure that the OSC is provided with up-to-date weather information as requested.

(2) Assist in calculating direction and downwind concentration of airborne contaminants.

2.3.3.15 Chief, Communications Squadron

The Chief, Communications Squadron (27 SPTG/CS) will:

(1) Ensure that a photographer documents with photographs, as directed by the OSC, the extent of the spill as well as the containment, countermeasures, and restoration procedures used.

2.3.3.16 Comptroller

The Comptroller will:

(1) Assign job numbers to identify resources on materials and labor due to oil or hazardous substance spills.

(2) Accumulate costs and report to the Wing Commander the value of resources expended.

(3) Initiate action to recover funds as appropriate.

2.3.4 Hazardous Materials Response Team (HAZMAT Team)

Trained personnel will remain on 24-hour alert at the Base Fire Department. The HAZMAT Team will work under the direction of the Base Fire Chief and in coordination with the OSC. The necessary equipment will be on hand for the HAZMAT Team to perform the following tasks in the event of an emergency:

(1) Serve as the first responder (if directed by the Fire Chief) to any spill where the amount of material spilled exceeds the Reportable Quantity (RQ).

(2) Provide emergency rescue of endangered personnel while protecting others from existing hazards.

(3) Establish a cordon around affected areas with controlled access/egress.

(4) Control, mitigate, or otherwise contain spill material to prevent loss of life and property and prevent degradation of the environment.

(5) Coordinate with outside spill response agencies and emergency personnel if OPLAN 355-1 is implemented.

The HAZMAT response effort requires the total cooperation of all organizations to handle the incident. The HAZMAT team is built around functional roles, or elements, with one or more persons assigned. Specific checklists covering each of the following functional elements shall be developed to handle incidents involving both facility and transportation, specific chemicals, and generic responses. Each of the functional elements is defined below.

The Hazard Group Supervisor will:

(1) Assist the OSC with the overall scene management and directly supervise the HAZMAT team, and

(2) Keep the OSC fully advised of technical or specific information relative to the spill incident at hand.

The Information Management Monitor will:

(1) Assemble and analyze all technical reference material, incident data, and other resources to include interviews with Bioenvironmental Engineering personnel and other technical specialists, and

(2) Make recommendations to the HAZMAT Supervisor concerning evacuation criteria, personal protective equipment and clothing, and mitigation procedures.

This is one of the first positions that will be filled during an incident, and requires one to three persons depending on the complexity of the incident.

The Safety and Health Monitor will:

(1) Monitor the safety and health of all personnel within the hazard area (hot and warm zones),

(2) Consult with the Bioenvironmental Engineering personnel and other technical specialists on the safety and health aspects of the incident,

(3) Have the authority to alter, suspend, or terminate activities that pose an imminent danger condition or are immediately dangerous to life or health,

(4) Remain in constant contact with the Hazard Supervisor and maintain a log of exposure times for each person in the hot zone, and

(5) Be knowledgeable in the operations being used and trained in the emergency handling of hazardous materials.

This position usually requires one to two persons depending on the complexity or geographical size of the incident.

The Entry Personnel Element will:

(1) Perform the physical reconnaissance of the problem area, if safely possible. They will document and report the presence of potential life hazards and environmental factors,

(2) Assist in plan formulation for control actions,

(3) Don proper protective equipment and gear and enter the hot zone to perform product control. All personnel in the hot zone must work in pairs. There must be backup personnel on standby to perform assistance or rescue of personnel in the hot zone wearing appropriate level of protective equipment, and

(4) Ensure that emergency medical services personnel are available with transport capabilities.

The element requires a minimum of four to six persons.

The Decontamination Element will:

(1) Determine the proper decontamination procedures and setup the decontamination zone site before anyone enters the hot zone,

(2) Coordinate all decontamination activities with the Hazard Group Supervisor, the Safety and Health Monitor, and the Information Management Monitor, and

(3) Perform decontamination procedures on all persons leaving the hot zone. Decontamination personnel shall wear personal protective equipment appropriate to the incident.

The element requires a minimum of four to six persons.

The Resources Management Element will:

(1) Control all tools, protective clothing,and equipment used during the incident,

(2) Be responsible for all members of the HAZMAT team not specifically assigned to other functional areas,

(3) Document the use of all expendable items, and

(4) Assist the Entry Element in donning an doffing their protective equipment and clothing.

This element requires a minimum of four to six persons depending on the complexity and/or geographic size of the incident.

2.3.5 Civil Engineering Cleanup Team (CECT)

The CECT will be staffed by the Civil Engineering Squadron and shall be under the control of the Base Civil Engineer. The CECT shall:

(1) Be staffed, trained, and equipped to handle oil and hazardous substance spills that may be encountered at Cannon AFB. Hazardous substance spills include nitrogen tetroxide and hydrazine.

(2) Respond to all Cannon-related spill emergency calls on and off base as requested by the OSC.

(3) Clean up the spills to satisfy all federal, state, and local requirements.

(4) Conduct bimonthly training sessions to prepare the Civil Engineering Cleanup Team members for oil and hazardous substance spills that may be encountered.

(5) Be placed on a recall roster to permit after-hours cleanup of oil and hazardous substance spills.

2.3.6 Tasked Commanders and Staff Agency Chiefs

It is the responsibility of tasked commanders and staff agency chiefs to publish such procedures that are necessary for implementing this plan and ensure that adequate training is

conducted and environmental protection/pollution abatement procedures are implemented in their areas of responsibility. They will designate additional project officers and monitors as required to ensure an effective program and continually inspect the work areas under their control to ensure that effective pollution abatement procedures are followed. They will also ensure that Site-Specific Contingency Plans developed for their particular areas are posted in prominent locations at potential spill sites.

2.3.7 Individuals Assigned, Attached to, or Working at Melrose AFR

Each individual assigned to, attached to, or working at Melrose AFR is tasked to report any spill of oil or hazardous substance to the Base Fire Department and to take every reasonable precaution to prevent the spillage of oil or hazardous substances. In addition, all contractors performing services will be notified prior to the initiation of the contract of their responsibilities to take every reasonable precaution to prevent the spillage of oil or hazardous substances and to report any spills of this nature to the Base Fire Department.

CHAPTER 3 - PLAN EXECUTION

3.1 GENERAL PROCEDURES

The Oil and Hazardous Substance Contingency Plan for Cannon AFB designates the procedures to be followed in the event of releases, accidents, and spills involving oils, sewage or hazardous substances and the organizations, personnel, and equipment responsible for carrying out the response functions.

The OSC is the individual assigned the authority for directing and coordinating all spill response actions. The OSC will have the authority to use the expertise and resources of the HAZMAT Response Team and personnel associated with the Primary Crash Network. Only the OSC or his/her designee can activate the HAZMAT Team. The activation of the HAZMAT Team and the Disaster Control Group (DCG) is effected to provide a coordinated response to contain, control, recover, and restore the environment from all spills. Annex IV summarizes all Base telephone numbers used for contacting these organizations. Off-duty telephone numbers are maintained by the primary and alternate OSCs, the Fire Department, and the Civil Engineering Service Call Desk. Annex IV also summarizes all off-base response organizations along with the telephone numbers used for contacting those organizations. The responsibilities of the OSC and personnel assigned to the HAZMAT Team and DCG regarding contingency planning are outlined in Chapter 2.

Due to the diversity of materials stored at Melrose AFR and the variable severity of the hazards presented in the event of a spill, the response actions will vary. General procedures should be reviewed and, if necessary, updated before adopting courses of action in a particular situation. Site-Specific Contingency Plans exists for each facility at Melrose AFR; these are referred to in Chapter 4 for use in the event of a release. The execution of the SPR Plan is divided into four phases:

- Phase I - Spill Discovery and Initial Notification,
- Phase II - Response Actions,
- Phase III - Short-Term Site Restoration, and
- Phase IV- Long-Term Site Restoration.

It should be noted that this plan deals primarily with solid and liquid pollutants.

3.2 PHASE I - INITIAL NOTIFICATION AND RESPONSE

Phase I designates the initial spill response procedures to be followed by any individual discovering a spill or potential spill of oil, sewage or hazardous substances. The person(s) discovering a spill is responsible for providing initial defensive actions without undue risk of personal injury. Figure 3-1 presents a flow chart for visualization of the notification and response processes. The initial notification will vary depending on the amount of material spilled.

(1) The party discovering the spill will immediately call the Fire Department at 911 to notify emergency personnel:

(a) When notifying the Fire Department of the spill occurrence, the following information should be provided if it is known or can reasonably be determined.

- Name of individual reporting spill.
- Location of spill, including street address.
- Number of injured personnel and nature of injuries (if applicable).
- Type of substance spilled.

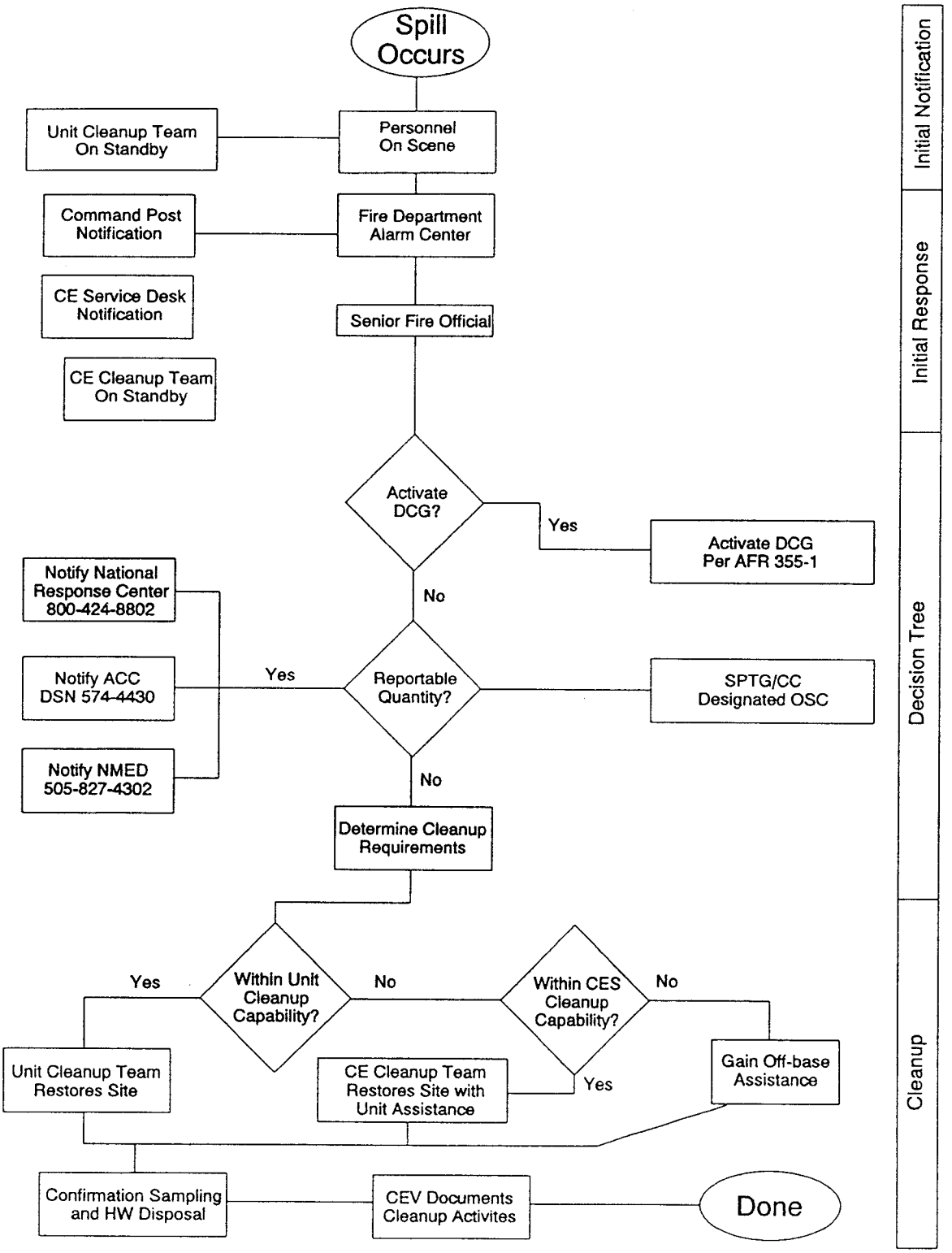


Figure 3-1. Decision Matrix

- Amount spilled (estimated).
- Rate material currently spilling (estimated).
- Time spill occurred (estimated).
- Extent spill has traveled.
- Any additional pertinent information (i.e., other potential hazards).

(b) After notifying the fire department, implement the following actions as necessary upon discovery of a spill. The order of the actions will depend on existing conditions.

- Initiate evacuation, if necessary.
- Notify Base Hospital (via ext. 4-911) for injuries.
- Check causes and stop the source of spill, when possible, without undue risk of personal injury; use of on-site spill containment equipment and materials may be necessary.
- Restrict access to spill scene to authorized personnel.
- Restrict all sources of ignition when flammable substances are involved.
- Report to OSC upon arrival.

(c) Base personnel other than Fire Department personnel receiving reports of spills shall aid in channeling the report to the Fire Department, who will respond as outlined.

(2) The Fire Department will:

(a) Immediately respond as necessary to protect life and property with due regard for the environment.

(b) Record spill reports on a Spill Report/Response Form (Annex I), designed to record the information listed in paragraph (1)b in this section along with the time of the report.

(c) Notify the Fire Chief and Environmental Flight (or Base Civil Engineer if Environmental Flight cannot be contacted) as well as the Base Hospital if injuries are reported. The Fire Chief will notify the Command Post, who will execute notification through the DCG. The Fire Chief will serve as the OSC until relieved by the Base Civil Engineer or the Base Commander. This designation is vital for success of the spill response. The current duty telephone numbers for these personnel are listed in Annex III.

(d) Activate the HAZMAT Team to establish cordon, contain migration, and rescue the injured.

(e) Notify the Chief of Operations or Deputy Chief of Operations when the cleanup team is needed.

(3) The Base Environmental Flight or Civil Engineer will:

(a) Respond with available personnel, equipment and materials, if requested by appropriate authority and approved by the OSC.

(b) Advise the cleanup team on cleanup procedures and proper disposal methods.

(4) The Command Post will:

(a) Maintain a current list of all members of the DCG including their duty telephone numbers (Annex III) as well as nonduty telephone numbers. A backup copy of this list will be posted at the Fire Department dispatch desk, which receives all CE Service Call Desk calls during nonduty hours.

(b) Activate the DCG members designated by the OSC and inform them to assemble within 15 minutes at a specified location.

3.3 PHASE II - FOLLOW-ON RESPONSE

(1) Spill Containment and Control:

To be written by Cannon AFB Fire Department

(2) Spill Response Actions: The OSC or his designee will direct and coordinate all spill response actions. The actions under the responsibility of the OSC are:

(a) Activate or authorize action from appropriate members of the HAZMAT Team based on information obtained during initial notification or information provided by the Environmental Flight and immediately investigate the reported spill.

(b) Determine the source, type, extent, approximate quantity, and cause of the spill and institute appropriate action to stop the source of spill, if the spill is still occurring.

(c) Evaluate the magnitude and severity of the threat to public health, welfare, and natural resources. Material Safety Data Sheets are on file with Bioenvironmental Engineering and should be maintained at each facility.

(d) Take appropriate safety precautions to protect response personnel and any additional personnel located in proximity to the probable spill route (in accordance with OPLAN 355-1). The Security Police Squadron (27 SPS) will be used to initiate evacuation procedures and establish traffic control points and entry control points as determined by the OSC.

(e) Institute spill containment procedures. In accomplishing this task, the OSC should refer to the following sources of information either contained in this document or kept on file:

- Chapter 4 for the Melrose AFR Site-Specific Contingency Plan.

- Material Safety Data Sheets which are on file with Bioenvironmental Engineering. The HMIS database can also be utilized.

- Annex II for spill response equipment inventories and locations of equipment.

- Annex V for a map to assist in the determination of probable spill routes and access to the spill sites.

(f) Determine the party responsible for the spill.

- If the USAF is the responsible party, spill cleanup actions will be the responsibility of the facility where the spill occurred.

- If someone other than the USAF is the responsible party, the responsible party should be informed of the spill and their response action evaluated by the Base OSC.

(g) Direct the Environmental Flight to contact HQ ACC/CEV by telecon (DSN 574-3553) if uncertain of the spill classification. For spills occurring after normal duty hours or on weekends, the ACC/CE alert duty officer should be contacted through the ACC Command Post (DSN 574-2224/2225).

(h) Determine whether a "Reportable Spill" has occurred. Annex IV includes "Reportable Spill" criteria for the substances identified on the Base as potential "Reportable Spill" substances.

(i) Telephonic and message notification of other federal and state agencies must be made promptly by the Environmental Flight representative following telecon notification of reportable spill to HQ ACC/CEV. These agencies are listed in Annex IV.

(j) Direct the Base Bioenvironmental Engineer to take samples to determine the chemical nature, pollutant concentration, and extent of the spill as required for response actions and documentation.

(k) Advise Base Public Affairs of the size and nature of the spill and response actions.

(l) Initiate cleanup actions. Pollutants will be collected to the maximum extent possible.

- Reusable or reclaimable JP-4 will be stored in tanks for proper disposition. All other oils and hazardous substances will be disposed of through DRMO in accordance with Cannon AFB Operations Plan 18-4, Management of Recoverable and Unusable Liquid Petroleum Products, or Cannon AFB Hazardous Waste Management Operations Plan, as appropriate.

- Absorbent and similar material will be placed in 55-gal drums, labeled, turned in to the DRMO (by the organization causing the spill) and stored there, if necessary, until eventual disposal in accordance with federal, state, and local environmental laws and regulations.

- Hazardous pollutants will be collected in polyethylene-lined drums (see 49 CFR 178.133) or other approved drums, as specified by 49 CFR 172.101 or 102; labeled; turned in to DRMO (by the organization causing the spill); and stored there, if necessary, until eventual disposal in accordance with DoD and RCRA regulations.

(m) Develop corrective action plans to ensure that spills or similar spills do not occur again.

(n) On completion of cleanup operations, a "final" report will be submitted to HQ ACC/CEV, with information copies to HQ USAF/CEV and NMED; within 15 days of a spill of hazardous waste requiring the implementation of the SPR Plan, such a report will be submitted to the Regional Administrator of EPA. Both regulatory agency reports and internal USAF reports should contain all of the information listed in Annex IV.

3.4 PHASE III - SHORT-TERM SITE RESTORATION

Phase III site restoration occurs when: (1) the spill has been deemed a "Reportable Quantity"; (2) the release has been mitigated, flow of spill material has ceased, and migration pathways have been closed; and (3) the event is no longer an imminent threat to humans or the environment.

Cleanup and disposal will then be the responsibility of the CECT under the authority of the OSC in coordination with the Base Civil Engineer and the Chief, Environmental Management. The cleanup method used will depend on the characteristics of the spilled material, size of spill, location of spill, character of the area, and potential impacts.

If it is decided to clean up the spill with on-base resources, the OSC will instruct the CECT to assemble and move to the Control Site. Cleanup personnel shall use proper protective equipment at all times during cleanup operations.

The CECT shall:

(1) Treat the spill, if safe and feasible, to mitigate hazards;

(2) Clean all contaminated surfaces of the spilled material. Water, detergents and/or solvents can be used to remove residual spill material from asphalt, and other hard, impermeable surfaces;

(3) Collect spill residue, other contaminated material, and all nonreusable cleanup materials, including disposable clothing, sorbents, brushes, rags, brooms, and containers. Package material in U.S. Department of Transportation-approved containers. Mark and label container in

accordance with Department of Transportation and EPA requirements, as appropriate;

(4) Thoroughly decontaminate and inspect all reusable protective clothing and equipment before it is returned to their proper storage location; and

(5) Ventilate indoor areas.

If it is decided that cleanup is beyond the capabilities of the CECT, the OSC shall activate any other appropriate on-base resources to aid in clean-up or coordinate any required additional assistance with the Wing Commander. If cleanup is done by an outside contractor or agency, the OSC shall maintain on-scene command and support cleanup as needed until relieved by higher authority, if necessary.

3.5 PHASE IV - LONG-TERM SITE RESTORATION

Phase IV may require an extended time period to complete. This phase includes spill site restoration where hazardous chemicals have contaminated large quantities of earth or groundwater or where surface water is contaminated. Phase IV actions will prevent further contamination, restore contaminated earth and water, and permit productive use of the spill site. These restoration activities are administrated and contracted out to a service contractor through the Environmental Flight Installation Restoration Program (IRP) section.

3.6 NOTIFICATION PROCEDURES

3.6.1 Initial Notification Checklist

The Initial Notification Checklist, provided in Annex I, should be used when notifying the Fire Department at Ext. 4-911 of a reportable spill. The minimum information that should be provided, as outlined in the checklist, is as follows:

a. Name/rank of individual reporting the spill.
b. Location of spill, including street address.
c. Description of injuries.
d. Name of spilled substance.
e. Amount of substance spilled.
f. Rate of spill (if spill is still occurring).
g. Time of spill.
h. Distance spill has traveled/spread.
i. Other pertinent information.

The completed form should be delivered to 27 SPTG/CEV within two working days after the incident.

3.6.2 Procedures for Notifying HQ ACC

HQ ACC/CEVCM is responsible for environmental oversight at Melrose AFR. It also provides advice and staff assistance in all areas of environmental protection including spill

response matters. HQ ACC/CEVCM is located at Langley AFB, VA and can be contacted in the following manner:

DSN	574-3553
Commercial	(804) 764-3553

3.6.3 Procedures for Notifying Regulatory Agencies

Submit a pollution report within 60 days of a "major" oil spill or when requested by the National Response Team and the Regional Response Team [40 CFR 300.56]; within 60 days of a 1,000-gal oil spill or two reportable oil spills in 12 months to the Regional Administrator of EPA [40 CFR 112.4]; within 60 days of a reportable spill of CWA Section 311 substances to the Regional EPA Enforcement Division Director and the appropriate state agency [proposed 40 CFR 151.4]; and within 15 days of a spill of a hazardous waste that requires the implementation of the SPR Plan to the Regional Administrator of EPA [40 CFR 264.56, 265.56]. The reports must be in narrative form for regulatory reports and as prescribed in Air Force Rule 19-8 for USAF Reports. The reports must contain the following information [40 CFR 300.56, 264.56, 265.56, Air Force Regulation 19-8 Paragraph 6, Figure 1]:

- Name, owner, and address of installation.
- Name and telephone number of OSC.
- Incident report (initial, second, third, final).
- Date and time of incident.
- Time of official spill notification to the National Response Center and other regional and state officials.
- Location of incident and the nature of the terrain at the location to include surface and subsurface drainage characteristics and relationships to water

bodies (estimate extent of area affected, such as miles of stream or acres of lake).

- Weather conditions and how they affected response action.
- Cause of incident.
- Type and estimated amount (barrels, gallons, pounds) of pollutant and the official size classification for oil spills (minor, medium, major).
- Actual damage and/or potential threat to human life, to property (private, state, or federal), and to plant or animal life.
- Corrective action taken to eliminate pollution source.
- Corrective action taken to remove pollutant.
- Assistance required (federal, state, private contractors).
- Estimated completion date of remedial actions and anticipated effectiveness.
- Estimated quantity and disposition of spill material and contaminated soil and water.
- Description of any problems encountered during implementation of the SPR Plan and an explanation of how the SPR Plan was, or will be, modified to prevent the recurrence of the spill event.
- Anticipated or actual reaction by the news media and public to the incident. Specify potential for liability (for internal USAF reports only).
- Whether all emergency equipment used in a spill response has been decontaminated. Response equipment must be decontaminated and ready for use before the areas of a facility affected by a spill can be put back into service [40 CFR 264.56, 265.56].
- A copy of this SPR Plan if one is requested.

3.6.4 Off-Base Contact Notification Procedures

Various off-base entities can be used for information and assistance during a spill event. A complete discussion of off-base resources is discussed in Section IV.

3.6.5 Activation of Disaster Control Group (DCG)

The DCG must operate in concert with the OSC to ensure that spill response and disaster response activities are coordinated when the DCG is activated. It is the responsibility of Commander 27 SPTG, acting as OSC, to implement Cannon OPLAN 355-1, if deemed necessary.

CHAPTER 4 - CONTINGENCY PLAN

4.1 IMMEDIATE SPILL EMERGENCY ACTION PLAN

WARNING: Predesignated personnel at Cannon AFB have been specifically tasked, trained, and equipped to respond to all hazardous substance spills. Unauthorized individuals shall never undertake the response to or investigation of any actual or suspected hazardous spill.

IN CASE OF AN OIL OR HAZARDOUS SUBSTANCE SPILL

- Initiate evacuation, if necessary.
- Notify Base Hospital (via ext. 911) for injuries.
- Notify 911 immediately. Be prepared to provide the information outlined below (Spill Response Checklist).
- Check causes and stop the source of the spill without undue risk of personal injury; use of on-site spill containment equipment and materials may be necessary.
- Make spill scene "OFF LIMITS" to unauthorized personnel.
- Restrict all sources of ignition.
- Report to OSC upon arrival.
- When notifying the fire department of the spill, the following information should be provided:
  - Name of individual reporting the spill;
  - Location of spill;
  - Number of injured personnel, types of injuries;
  - Type of substance spill;
  - Rate material is currently spilling (estimated);
  - Time that spill occurred (estimated);

— Extent spill has traveled; and

— Any additional, pertinent information.

4.2 GENERAL FACILITY INFORMATION

Melrose AFR is approximately 40 miles west of Cannon AFB in Roosevelt County, New Mexico. The primary function of the range is to provide support facilities for USAF aircraft to practice conventional and nuclear bombing and strafing techniques. The primary wastes generated by the range are diesel fuel, used engine oil, and waste paints.

The facility has been in operation since 1965 and is attached to Operations Group. The facility consists of the following structures:

- Operations Center
- Fire Department Annex
- Aboveground Storage Tanks for Fuels
- Open Detonation Thermal Treatment Unit

Personnel at this facility are military and civilian and work the following shifts:

Shift	Area Supervisor	Extension	Military	Civilian
Days	Range Manager	4-2571	1	7

4.3 POTENTIAL SPILL ROUTES

Spills within the buildings will be contained inside. If a spill occurs in the compound, the spill will migrate into the ground and will have to be cleaned up accordingly.

4.3.1 Fire Safety Plan

(1) Building Construction: Metal frame on concrete foundation. Steel roof.

(2) Evacuation: In the event of a fire or potential fire/explosion, all personnel in any building within 500 feet in all directions will be evacuated. Toxic/flammable vapors or fumes being carried downwind may endanger personnel in building in all directions. Notify the Fire Department immediately to alert local authorities.

(3) Containment Measures:

- Minor spills occurring inside the building should be confined with absorbents. Material should be picked up and containerized, if possible. The spill area should be cleaned up using absorbent materials.

- Major spills should be contained by absorbent materials and cleaned up by the CECT.

- Releases involving the thermal treatment unit will be handled in accordance with the operating procedures outlined in the RCRA Permit

for Open Detonation Activities at Melrose AFR, Section G - Contingency Plan.

(4) Utilities: The building is heated using natural gas. Primary lighting is provided through overhead florescent bulbs. There are lights located at each exit from the facility.

4.4 FIRE AND SPILL EQUIPMENT

Fire extinguisher are located throughout the facility. The following spill response equipment and materials are stored at the range:

Quantity	Description
13	Halon 1211, 28 pound, Model GH-17F fire extinguishers
2	Water hose connection with hose
2	Face shields
2	Pair chemical resistant gloves
2	Rubber aprons
1	Eyewash station (adjacent to vat room)
1	Nonaggressive fluid absorbent spill kit (PIG Corp)
1	50-lb bag of absorbent material
4	55-gal OH drums (17E)
4	Telephones (three in main building and one in tower)
1	Radio - UHF, VHFD fixed site
6	Johnson handheld
3	CBs (one in each vehicle)

Quantity	Description
3	Pick up trucks
1	Dumptruck
1	Grader
1	Backhoe
1	Bull Dozer
2	500-gal water trucks

Procedures should be implemented to ensure that this equipment is in a state of readiness and that, after use, reusable equipment is cleaned and fit for reuse. Used equipment should be assessed to ensure that only reusable equipment is cleaned. Other used equipment should be managed as hazardous waste and replaced immediately by the Environmental Management Office.

During thermal treatment operations, munitions and EOD personnel will have on-hand the following additional equipment.

Quantity	Description
1	First Aid Kit
1	Fire extinguishers per vehicle
1	Respirator with appropriate cartridges per person
2	Shovels per EOD vehicle
1	55-gal open head drum
1	Chemical apron per person
1	Pair leather or rubber gloves per person
1	Pair rubber boots per person
1	Pair goggles or face shields per person
4	Handheld Motorola Radios

1 Front End Loader

1 Ambulance or first aid vehicle

4.5 HAZARDOUS MATERIALS STORED AT THIS SITE

Material Stored	Approximate Maximum Quantity	Location
Used Engine Oil	<20 gal	Used Oil Collection Point
Diesel Fuel	<500 gal	Hazardous Material Storage
Paint Products	<10 gal	Hazardous Material Storage

The Material Safety Data Sheets for substances used at this site are located in the training office.

4.6 INSPECTIONS AND PERSONNEL TRAINING

The facility hazardous waste monitor conducts weekly inspections of the hazardous materials generating areas. These inspections are documented in the hazardous waste logs and any deficiencies noted are immediately corrected.

All personnel who work with hazardous materials in the shop are required to take both Hazardous Communications training through Military Public Health and Hazardous Waste Management Training through Environmental Management. Training includes:

- Identification and use of hazardous materials, hazardous waste, and oil products;
- The use of spill and fire control equipment;

- Spill response procedures for various work areas;
- The locations and functions of all shutoff switches;
- The physical characteristics and hazards associated with materials used in the shop; and
- Safe operating procedures for all shop activities.

4.7 PLAN UPDATING AND POSTING REQUIREMENTS

The facility supervisor shall notify the Environmental Management Office in writing whenever changes occur at this facility which may affect the effective implementation of this plan. At a minimum, the plan must be updated annually. The Environmental Management Office is responsible for updating this site-specific contingency plan.

The facility supervisor must post a copy of this site-specific contingency plan in an open area, accessible to all personnel working in the shop. In addition, all personnel must have access to the Material Safety Data Sheets for any hazardous materials used by the facility.

CHAPTER 5 - TRAINING REQUIREMENTS

All military, civilian, and contractor personnel assigned to Melrose AFR will successfully complete a training program that teaches them to perform their duties in a way that ensures compliance with the federal, state, and DoD regulations.

5.1 PERSONNEL TRAINING REQUIREMENT

Commanders will ensure all personnel (military and civilian) who use, handle, or are potentially exposed to oil or hazardous substances complete the Federal Hazard Communication Training Program in accordance with Air Force Occupational, Safety and Health Standard 161-21, dated 23 January 1989 and OPLAN 355-1. This training will be conducted upon initial work area assignment and whenever a new hazard is introduced into their working area. OSHA HAZWOPER Training in accordance with OSHA regulation 29 CFR 1910.120 and HQ ACC - Hazardous Waste Operations and Emergency Response Implementation Guidance.

5.1.1 Level 1 - First Responder (Awareness)

This level is covered under HAZMAT Training administrated by the Readiness Flight. Personnel covered include: Security/Law Enforcement, Command and Control, Air Traffic Control, Accumulation Point Managers, Hazardous Material Storage Location Personnel, Ground Safety Personnel, Readiness Personnel, and On-Scene Disaster Control Group (DCG) (As Assigned).

5.1.2 Level 2 - First Responder (Operations)

This level is covered under HAZMAT Training administrated by the Readiness Flight. Personnel covered include: On-Scene Disaster Control Group (DCG) (As Assigned), Fire Protection, Environmental Managers, Fuels Management Personnel, Bioenvironmental Engineer, Safety, Readiness Personnel, Accumulation Point Managers, and Hazardous Material Users (as directed by EPC).

5.1.3 Level 3 - Hazardous Materials Technician

Level 3 will be provided by Fire Department training personnel or by contractors administrated through the Environmental Flight. Personnel covered include: Explosive Ordnance Personnel, HAZMAT Response Team, Cleanup Response Team (as assigned), Fuels Management Personnel, and Readiness.

5.1.4 Level 4 Hazardous Materials Specialist

Level 4 will be provided by Fire Department training personnel or by contractors administrated through the Environmental Flight. Personnel covered include: HAZMAT Response Team Leader(s), Cleanup Response Team Leaders, Hydrazine Specialists, Bioenvironmental Engineers and Technicians, and Environmental Flight.

5.1.5 Level 5 - OSC

This training must be the requirements of the formal Air Training Command (ATC) OSC Course G307R0516-001, in accordance with Air Force Rule 355-1, Chapter 7. Personnel covered include: Installation Commander, Logistics Group Commander; Operations Group Commander, Support Group Commander; Disaster Preparedness, and Senior Fire Officials.

5.1.6 Level 6 - Cleanup Response Team Members

Level 6 will be provided by Fire Department training personnel or by contractors administrated through the Environmental Flight. Personnel covered include personnel assigned to the Cleanup Response Team and Fuels Management Personnel.

5.2 HAZMAT TEAM TRAINING

All Base personnel designated by the Fire Department as part of the HAZMAT Team must take part in periodic spill response training programs. The training will be in accordance with the Occupational Safety and Health Administration (OSHA) Rule protecting hazardous waste workers and emergency responders (29 CFR 1910.120) Fire fighters will complete their training in accordance with ACC Supplement 1 to Air Force Rule 92-1.

The training will consist of formal classroom training and spill exercises. Spill response exercises will be conducted at least annually. Response to an actual spill will satisfy the annual requirement for spill response exercises. New HAZMAT Team members should be given a copy of the SPR Plan and be briefed when they are assigned to the team.

5.3 CIVIL ENGINEERING CLEANUP TEAM (CECT)

All Base personnel assigned and designated by the Chief of Operations as part of the CECT, must take part in the periodic cleanup response training program. The training will be in accordance with the Occupational Safety and Health Administration (OSHA) rule protecting hazardous waste workers and emergency responders (29 CFR 1910.120).

The training will consist of formal classroom training and spill exercises. Spill response exercises will be conducted at least annually. Response to an actual spill cleanup will satisfy

the annual requirement for a spill response exercise. New CECT members should be given a copy of the SPR Plan and be briefed when they are assigned to the team.

CHAPTER 6 - PLAN REVIEW AND UPDATE

The SPR Plan will be reviewed annually, at a minimum, and amended as required. Other circumstances which will warrant a plan review and update are listed as follows:

- When a RCRA permit is modified;
- When facility changes occur which increase the potential for spills or change the spill prevention and response procedure methods and equipment;
- When the SPR Plan fails or proves to be ineffective in the prevention of or response to a spill event;
- At the request of the U.S. Environmental Protection Agency or the New Mexico Environment Department;
- After enactment of, or amendment to, pertinent federal or state legislation, or changes in DoD or USAF policy. Particular attention should be given to changes in reportable spill quantities;
- After pertinent modifications of federal, regional and state contingency plans;
- After any changes in adjacent land and water use that would affect spill prevention and response considerations; and
- At the request of the Cannon AFB EPC.

The Environmental Protection Committee will be responsible for reviewing the report, monitoring any corrective actions and amending the SPR Plan when necessary. The review of the SPR Plan, and any resulting amendments or changes to the plan will be logged on the record sheet at the front of this document.

ANNEX I

CHECKLISTS FOR SPILL NOTIFICATION AND RESPONSE

27TH FIGHTER WING (ACC)
MELROSE AIR FORCE RANGE
NEW MEXICO 88103-5000
25 FEBRUARY 1993

CHECKLISTS FOR SPILL NOTIFICATION AND RESPONSE

These checklists are to be used by the various response facilities and responders to spills during response to emergencies. The checklists used by the facilities are:

INITIAL RESPONSE CHECKLIST

- [ ] Institute evacuation procedures, if applicable.

- [ ] Notify the Fire Department, 911.

- [ ] Give first aid to injured personnel.

- [ ] Stop the source of the spill when possible, without undue risk of personal injury. This includes use of on-site spill containment equipment and materials.

- [ ] Restrict access to spill scene to authorized personnel.

- [ ] Restrict all sources of ignition when flammable substances are involved.

- [ ] Report to On-Scene Coordinator and provide assistance until team is fully operational.

SPILL REPORT/RESPONSE FORM

WHEN A SPILL OCCURS:

NOTIFY BASE FIRE DEPARTMENT VIA EXT. 911

A. Provide the following information:

Name/Rank/Grade of Reporter: _____

Organization Causing Spill: _____

Phone: _____

Time & Date of Incident: _____

Type of Spill:

_____ Sewage

_____ Hazardous Waste (Specify) _____

_____ Polychlorinated biphenyl

_____ Oil/Fuel Oil/Hydraulic Fluid (Circle One)

_____ Fuel/JP-4 (Circle One)

Amount Spilled: _____

Location of Spill: _____

Cause of Incident: _____

_____

Extent Spill Traveled (into storm drains, oil/water separators, or ground): _____

_____

Rate of Spill (estimate): _____

_____

Corrective Actions Taken (if any): _____

_____

_____

A copy of this form should be forwarded to 27 CES/CEV within two days of an incident.

SERVICE CALL DESK CHECKLIST

1. Initial Information Required:

Name of Informant: _____
Location of Spill: _____
Substance Spilled: _____
Amount Spilled (Estimated): _____
Time Spill Occurred (Estimated): _____

2. Action Outline:

A. Immediately notify and provide initial information to:

Fire Department (CEF) Time: _____
24 Hours: Ext. 911

Environmental Coordinator/Office Time: _____
Duty Hours: Ext. 2739/4639
Nonduty Hours: Same

B. Initiate notification to the following after receiving notification from either the Fire Department or the Environmental Management office that additional notification is necessary.

Base Civil Engineer (CE) Time: _____
Duty Hours: Ext. 2008
Nonduty Hours: Ext. 2253

Chief of Operations (CEO) Time: _____
Duty Hours: Ext. 4357
Nonduty Hours: Ext. 2001/2002/2578

Squadron Duty Officer (CE/CCQ) Time: _____
Nonduty Hours: Ext. 2001/2002/2578

Base Bioenvironmental Engineer Time: _____
Duty Hours: Ext. 4063
Nonduty Hours: Ext. 4033

Readiness Flight (CEAD) Time: _____
Duty Hours: Ext. 4177
Nonduty Hours: Ext. 2253

Command Post Time: _____
Duty Hours: Ext: 2253

BASE FIRE DEPARTMENT CHECKLIST

1. Initial Information Required:

Name of Informant: _____

Phone Number of Informant: _____

Location of Spill: _____

Substance Spilled: _____

Amount Spilled (Estimated): _____

Time Spill Occurred (Estimated): _____

Injuries: _____

Other Pertinent Information: _____

_____

_____

2. Action Outline:

A. Immediately notify and provide initial information to:

Service Call Desk (CEMRC) Time: _____
24 Hours: Ext. 2001

Note: Do not initiate notification over the Primary Crash Network until determination is made to implement the Spill Prevention and Response Plan.

3. Follow-up Information:

Follow normal Fire Department Standard Operating Procedures for follow-up on oil spills.

CHEMICAL MISHAP

1. Obtain the following: Time

   A. Location of Incident: _____ _____
   B. Nature of Incident: _____ _____
   C. Type/Amount/Name or ID# of Material:
   _____ _____
   _____
   D. Health Hazard: _____
   _____ _____
   E. Callers Name/Phone/Location: _____ _____
   _____
   _____
   F. Any Other Information Available: _____ _____
   _____
   _____

2. Dispatch Vehicles: _____

3. Notify the Following:

   A. Security Police: Day x4-2677 / Night x4-2677 _____
   B. Command Post: Day x4-2253/2256 / Night x4-2253 _____
   C. Fire Chief: Day x4-4852 _____
   D. CE Commander Day x4-2008 _____
   E. CE Service Call Day x4-2001/2002 / Night x4-2001/2002 _____
   F. Bioenvironmental Day x4-4063 _____
   G. Recall Firefighters Day x4-2794/2881 / Night x4-2794/2881 _____
   H. CHEMTREC 1-800-424-9300 _____

4. Other Emergency Actions: _____

_____

_____

ASSISTANT CHIEF'S RESPONSIBILITIES

1. Establish a staging area at least 4,000 feet upwind.

   A. Plot Incident Location; Grid Location: _____

   B. Plot and Establish Entry Control Point (ECP): _____

2. Have Security Police Begin Evacuation, if necessary.

3. Get As Much Information As Possible:

   A. Type/Amount/Name or ID# of Material:

   _____

   _____

   B. Health Hazard: _____

   _____

   C. Callers Name/Phone/Location: _____

   _____

   D. Any Other Information Available: _____

   _____

   _____

4. Request D R F.

5. Request Spill Assessment Team.

6. Establish a Decontamination Area.

7. Address Utility Hazard Potential:

   A. Drainage or Sewers: _____

   _____

   B. Electrical and Gas: _____

   _____

8. Other Emergency Actions: _____

_____

_____

FIRE DEPARTMENT - UPON ARRIVAL

1. If spill or wet areas are seen, stay away from them. Park uphill and upwind from spills.

2. If vapor release is suspected, stay well away from it as an invisible cloud is usually much larger than a visible cloud.

3. If no release is seen, look at spectators to spot any people who are ill or unconscious. If people are down, stay away until you know what the situation is and can protect yourself.

4. Always go in slowly to avoid "getting in too deep" before you realize it.

5. You may have to stop well back from an incident and send in two firefighters in full gear and SCBA to check the situation out. They should go in slowly; approach from upwind; use detection and explosion meters, explosion proof lights, and no radios; and stay out of observed chemicals.

6. Get information shipping papers, material safety data sheets from people at the scene (driver, plant officials, eye witnesses).

7. Establish control points for entering and leaving incident area for emergency services (and public, if necessary).

8. Establish separate holding areas for personnel or victims who accidentally become contaminated.

9. From a distance, use binoculars to look for placards on vehicles.

10. If you do not know, stay back (down the road or outside the gate) and appraise the situation slowly and carefully before doing anything.

11. Establish command post and staging areas well away from the area on the upwind side only.

12. Get technical help with expertise on the hazardous material involved.

13. Remember—you do not carry the equipment and entry suits for all chemicals so you cannot deal with all chemicals.

14. Some gases are toxic (can be absorbed through the skin and through standard turnout gear) and odorless.

15. If you cannot find out what chemical is involved, treat it as highly toxic, violently reactive, or explosive.

FIRE DEPARTMENT - RESTRICTED ENTRY

As soon into the operation as possible, areas of restricted entry (zones) will be established. these areas shall be termed:

1. Area of maximum hazard (exclusion or hot)

2. Decontamination area (warm)

3. Clean area (cold)

The first arriving units will establish an initial hot zone. The HAZMAT Response Team and Safety Officer will establish restricted entry areas. Boundaries of zones may be adjusted as conditions dictate. The following guidelines will apply:

1. Geography, weather conditions, building layout, properties and state of product involved, and other varying factors will influence boundaries of restricted entry areas.

2. Only those persons properly protected will be allowed into the hot and warm zones at any time.

3. Persons exiting the hot zone must pass through controlled access points and undergo proper decontamination and medical evaluation.

4. Exit from warm zone will be allowed only after proper decontamination has been performed.

5. Zone boundaries and controlled access points will be clearly marked.

6. All command posts, canteens, press areas, staging areas, etc. must be located out of the hot and warm zones.

ON-SCENE COORDINATOR CHECKLIST

1. Initial Information Required:

   Name of Informant: _____

   Location of Spill: _____

   Substance Spilled: _____

   Amount Spilled (Estimated): _____

   Time Spill Occurred (Estimated): _____

2. Action Outline:

   A. Report to Civil Engineer Control Center (CECC)

      1. Pick up a radio, vehicle, and driver (Tower and CE frequencies).

      2. Pick up OSC tube and this checklist.

   B. Proceed to site of spill and take command. Assistance will be provided by the Base Civil Engineer, Base Environmental Coordinator, Bioenvironmental Engineer, Legal Office, Photo Lab, Security Police, and Command Post.

   C. Stop spill at the source. Remove hazardous equipment and aircraft.

   D. Make initial damage assessment report to CECC.

      1. Identify spill material, quantity, and source.

      2. Estimate course of spill and time to a key terrain feature.

   E. Order Civil Engineering Cleanup Team actions. Consider:

      1. Manpower available.

      2. Heavy equipment (CE, Supply, Transportation)

      3. Damming materials and predesignated dam positions.

      4. Sorbent materials.

      5. Final containment devices such as radial gates on drainage ditches.

F. Direct Bioenvironmental Engineer to sample affected and unaffected water courses.

G. Direct Security Police to cordon off hazardous areas and detour traffic.

H. Direct Legal Office to gather data if a civilian contractor may be involved.

I. Direct photographer to photograph and record the times of key events and evidence.

J. Direct Procurement to authorize purchase of material and equipment, as needed.

K. Supervise cleanup and restoration.

L. Complete Summary Report.

3. Reports: The OSC will prepare and maintain a report on each oil spill to include the following information:

A. Location of Spill

B. Date and Time of Spill

C. Time of Response

D. Circumstances which caused the spill.

E. Type and amount of pollutant spilled.

F. Actions taken to recover pollutant.

G. Actions taken to prevent reoccurrence of the incident.

H. Cost estimate to correct incident.

ANNEX II

EQUIPMENT INVENTORIES

27TH FIGHTER WING (ACC)
MELROSE AIR FORCE RANGE
NEW MEXICO 88103-5000
25 FEBRUARY 1993

EQUIPMENT INVENTORIES

This annex lists the equipment that has been staged at various areas throughout Melrose AFR and Cannon AFB. The equipment listed may be procured by the On-Scene Coordinator or designee in the event of an oil or hazardous substance spill. Equipment requests shall be made by telephone to the appropriate shop supervisor or squadron commander. Upon authorized requests, the supervisor or commander will arrange prompt delivery of the equipment to the scene of the incident. Availability of assigned vehicles and equipment shall be determined through the vehicle status charts in the Damage Control Center and at Motor Vehicle Dispatch, Ext. 4-2832.

These lists shall be updated annually, or as available resources change. Information gathered for Disaster Preparedness Plan updates can be useful in updating this set of lists.

27TH FIGHTER WING (ACC)
MELROSE AIR FORCE RANGE
NEW MEXICO 88103-5000
25 FEBRUARY 1993

PHONE LIST FOR RESOURCES

_____	Fire Department	Day	4-911
		Night	4-911
_____	Civil Engineering Service Call (SC)	Day	4-2001
		Night	4-2001
_____	Security	Day	4-2677
		Night	4-2677
_____	Environmental Management	Day	4-2739
		Night	4-2001
_____	Bioenvironmental Engineering	Day	4-4063
		Night	4-2001
_____	Liquid Fuels Maintenance	Day	4-2112
		Night	4-2001
_____	Petroleum, Oils, Lubricants (POL)	Day	4-4531
		Night	4-4531
_____	Disaster Preparedness	Day	4-4177
		Night	4-2001
_____	Motor Pool Vehicle Dispatch	Day	4-2833
		Night	4-2001
_____	Medical (Emergency Room)	Day	4-4033
		Night	4-4033
_____	Aerospace Ground Equipment (AGE)	Day	4-2696
		Night	4-2695

SPILL RESPONSE EQUIPMENT

1. Transportation

Item Description	On-Hand
General Purpose Vehicles:	
Bus, 28 passenger	5
Bus, 44 passenger	2
Step Van, 1 Ton	5
Step Van, 1 1/2 Ton	1
Commercial Van, 2 1/2 Ton Cargo	2
Truck, 1 Ton	3
Truck, 1 1/2 Ton	3
Special Purpose:	
Tractor, 5 Ton	2
Tractor, 10 Ton	2
Wrecker, Commercial, 5 Ton	1
Wrecker, M-816, 5 Ton	1
High Reach	1
1200 Gallon Gas Truck	3
H-11 Crane	1
MB-4 Aircraft Tug	3
U-18 Crash Recovery Tug	1
U-39 Snow Removal Truck	1
SnoW Removal, Blast Truck	2
Farm Tractor, WHLD Industrial	2
Sweeper, R/W	2
Sweeper, Street	2

Item Description	On-Hand
C-300 Refueling Truck	1
1,500 Gallon Water Truck	1
Forklift, Rough Terrain, 6,000 Lbs	1
Heavy Equipment:	
Loader, 25,000 Lbs, A/C	2
Dump Truck, 5 Ton	4
Dump Truck, 10 Ton	1
Grader, Road	1

2. Fire Department (HAZMAT Response Truck)

For a complete listing of equipment and tools kept by the Base Fire Department, contact Ext. 4-4270.

3. Base Spill Kit

Item Description	Unit	Quantity
85 Gallon Overpack Drum	EA	15
55 Gallon Drum, Steel, Open Head	EA	10
55 Gallon Drum, Steel, Closed Head	EA	10
Rags	BUNDLE	2
Hard Hats	EA	15
Face Shield, Silicone	EA	15
Aprons, Full Length, Rubber	EA	15
Gloves	PR	15
Shovels	EA	6
Non-Sparking, Square Blade		3
Steel, Square Blade		3
Steel, Pointed Blade		2
Goggles	EA	15
Sample Bags, Plastic	BOX	3
Bung Wrench	EA	2
Rachet Wrench w/ 15/16" Socket	EA	1
Crescent Wrench, 3/4"	EA	2
Boots, Chemical Resistent	PR	15
Handpump, Corrosion Resistent	EA	1

	Unit	Quantity
Respirators, Full Face Shield	EA	30
3M Easi-Air, Size Medium	12	
3M Easi-Air, Size Large	8	
Respirator Cartridges (1 Pair Per Resp.)	PR	
Acid Gas, Organic Vapor	40	
HEPA, Dusts, Mists	10	
Respirator Filter Clips (1 Pr per Resp.)	PR	
Acid Gas, Organic Vapor	10	
HEPA, Dusts, Mists	10	
Vermiculite	LBS	300
Sodium Bicarbonate	LBS	500
Absorbent Socks	EA	200
Socks, PIG, Size Small	EA	25
Socks, PIG, Size Large	EA	25
Pillows, PIG	EA	25
Bucket, 5 Gallon	EA	5
Epoxy Putty Drum Repair Kit	ROLL	12
Storage Bags, Respirator	EA	90
Eye Wash (6 min. Portable)	EA	2
Multi-channel radios with charger unit	EA	3
10 Gallon Water Jugs	EA	3
First Aid Kit	EA	1
Box Ear Protectors	EA	1

Reference Material:
NFPA Fire Protection Guide on Hazardous Materials (Environmental Management)
C.H.R.I.S. Manual (Environmental Management, Fire Department)
SAX Dangerous Properties of Industrial Materials (Environmental Management)

ANNEX III

SUMMARY OF CANNON AIR FORCE BASE CIVIL ENGINEERING CLEANUP TEAM MEMBERS/ORGANIZATIONS AND CURRENT TELEPHONE CONTACT NUMBERS

27TH FIGHTER WING (ACC)
MELROSE AIR FORCE RANGE
NEW MEXICO 88103-5000
25 FEBRUARY 1993

KEY PERSONNEL PHONE LISTING

	DUTY PHONE	AFTER HOURS
Base Operations	4-2801	4-2801
Command Post	4-2253	4-2253
On-Scene Coordinator (OSC) 27th Support Group Commander 1755 Midway Circle Cannon AFB, NM 88103-5000	4-2761	4-5031
Base Civil Engineer 1753 Midway Circle Cannon AFB, NM 88103-5000	4-2008	4-2001
Base Fire Chief	4-911/4852	4-911/4852
CE Service Desk	4-2001/2002	4-2001
Environmental Coordinator	4-2739	4-2001

27TH FIGHTER WING (ACC)
MELROSE AIR FORCE RANGE
NEW MEXICO 88103-5000
25 FEBRUARY 1993

PRIMARY CRASH NETWORK PHONE LISTING

	DUTY PHONE	AFTER HOURS
Bioenvironmental Engineer	4-4063	4-4033
Disaster Preparedness	4-4177	4-2253
Security Police	4-4111	4-4111
Liquid Fuels Maintenance	4-2112	4-2001/2002
Staff Judge Advocate	4-2211	4-2253/4111
Public Affairs	4-4131	4-2253
Safety Office	4-2811	4-2253
Base Hospital (Emergency)	4-4033	4-4033
Explosive Ordnance Disposal	4-2909	4-2253
Maintenance Control Center	4-2541	4-2541
Vehicle Control Center	4-2775	4-2775
Weather Forecasters	4-2748	4-2305
Switchboard	4-3311	4-3311
Chaplain	4-2507	4-2253
Mortuary Affairs	4-2374	4-2253
Alert Photographer	4-2765	4-2253
Base Contracting	4-4520	4-2253

OUTSIDE EMERGENCY RESPONSE AGENCIES

U.S. Environmental Protection Agency,
Region VI
Attn: Mr. Richard Mayer
1445 Ross Avenue
Dallas, Texas 75202-2733
(214) 655-6776

NM Environmental Department
Office of Hazardous and Radioactive Waste
Attn: Mr. Ed Horst
1190 St. Francis Drive
Santa Fe, New Mexico 87502
(505) 827-4300

Clovis Fire Department
Attn: Mr. Ron Edward
320 Mitchell Street
Clovis, New Mexico 88101
Emergency: 911
Non-emergency: 763-5531

Portales Fire Department
Attn: Capt. Steve Potest
301 South Avenue C
Portales, New Mexico 88130
Emergency: 911
Non-emergency: 1-356-4406

Melrose Fire Department
Attn: Mr. Keith Shaw
420 5th Street
Melrose, New Mexico 88124
Emergency: (505) 253-4222

Clovis High Plains Hospital
Emergency Department
Attn: Ms. Diane Martin
2100 North Thomas Street
Clovis, New Mexico 88101
769-7169

Roosevelt Hospital Laboratory
Attn: Mr. Bobby Lyons
1700 South Avenue O
Portales, New Mexico 88130
1-356-4411

Curry County Sheriff
Emergency: 911
Non-emergency: 769-2335

Roosevelt County Sheriff
Emergency: 911
Non-emergency: 1-365-4404

N.M. State Highway Patrol
Emergency: 911
Non-emergency: 7863-3426

Clovis Civil Defense
769-2381, ext. 502

Portales Civil Defense
1-356-4404

ANNEX IV

SUMMARY LISTING OF OFF-BASE SPILL NOTIFICATIONS PROCEDURES AND RESPONSE ORGANIZATIONS

27TH FIGHTER WING (ACC)
MELROSE AIR FORCE RANGE
NEW MEXICO 88103-5000
25 FEBRUARY 1993

COORDINATION WITH SPECIAL FORCES

Several USAF special commands and other federal special response tams are readily available to provide technical support, advice, and assistance in the event of a spill or release. Support from these special forces will, when required, be requested as detailed below, and will be funded by the major claimant for the incident.

1.0 USAF AGENCIES

1.1 Air Combat Command (HQ ACC/CEVC), Langley AFB, Langley, VA

Responsible for ensuring environmental compliance of all USAF installation. The office can provide advice and staff assistance on all areas of environmental protection including spill response matters. Request for HQ ACC/CEVC support can be made by DSN 574-3553 or commercial (804) 764-3553.

1.2 Air Force Center for Engineering and Services Agency (AFCESA), Tyndall AFB, Panama City, FL

Provides technical guidance and assistance to major commands and bases in contingency operations and environmental planning. Request for AFCESA support can be made to the Vice Commander, DSN 523-6431 or the Fire Protection/HazMat Personnel at DSN 523-6149/6151 or commercial (904) 283-6151.

1.3 Air Force Occupational and Environmental Health Laboratory (OEHL)

Assigned responsibility for providing consulting services n spill sampling contaminant treatment methods, as well as analytical support during response and recovery operations.

For complex spill problems, on-site support may be provided. Request for OEHL support may be made through DSN 240-3005 (consulting) or 240-3626 (analytical support).

2.0 NON-USAF AGENCIES

2.1 Regional Response Team (RRT), EPA Region IV, Dallas, TX

Can act as emergency response team to assist and advise the OSC, during the pollution emergency. The RRT consists of representatives of participating federal and state agencies and local municipalities, and can bring all their expertise and resources of these agencies and coordinate their actions in supplying needed assistance to the OSC. A directory of the participating agencies is provided in Annex III of this plan. The team can be reached through the EPA Public Information Center at (214) 767-3274.

2.2 State of New Mexico Response Team, Santa Fe, NM

Can provide technical expertise and will be notified during spill response. The State OSC will be familiar with the available sources of spill response equipment within the State of New Mexico. Request for assistance can be made through their 24-hour reporting office at (505) 827-8329. The local contact for the State is Mr. David Tanner, Clovis, NM who can be reached at (505) 769-3728.

2.3 City of Melrose Fire Department

The City of Melrose Fire Department and local Civil defense Agencies will provide available personnel and equipment as requested to control hazards. These agencies will be activated through procedures established in the Cannon AFB OPLAN 355-1 and the mutual aid agreements signed by the Cannon AFB Fire Chief and the City of Melrose Fire Chief. The

Point of Contact for the City of Melrose Fire Department is Mr. Keith Shaw at (505) 253-4222.

2.4 Special Pollution Control Forces

Established under the NCP to assist the RRT, these agencies can provide the OSC with high level trained personnel and equipment, technical expertise, scientific support, communication support, and advice in pollution response matters. These agencies include:

- U.S. Cost Guard National Strike Force;
- EPA Environmental Response Team;
- EPA Technical Assistance Team;
- USCG Emergency Task Force; and
- USCG Public Information Assist Team.

Requests for assistance from these agencies shall be made by the OSC through the RRT, when required, according to proper procedures, established in the EPA/USCG regional contingency plans. The types of assistance provided by these special forces are also described in the federal regional plan. A directory of these organizations in included in Annex III of this plan.

3.0 NATIONAL HOTLINES AND PUBLICATIONS

3.1 Chemical Transportation Emergency Center (CHEMTREC)

A 24-hour hotline that provides warnings and listed guidance to the OSC when a spill product can be identified by either chemical or trace name, or other identifying characteristics. CHEMTREC will also assist the OSC in contacting the manufacturer or shipper for additional information. this service should only be used whenever adequate spill information is not available. the telephone number for CHEMTREC is 1-800-424-9300.

3.2 Chemical Hazards Response Information System (CHRIS)

An official publication of the USCG that currently provides technical information and appropriate response procedures for over 1,000 different substances. The manual contains four volumes which are periodically updated.

3.3 Environmental Technical Information System (ETIS)

A computerized information system which contains Federal and State environmental regulations, directories of Federal and State environmental contacts and computer modeling capabilities. The ETIS systems manager is the U.S. Army Construction Engineering Research Laboratory. AFCESA manages USAF use of the system. Information on the system and how to access it can be requested through DSN 970-6167 or commercial (904) 283-1667.

3.4 DoD Hazardous Material Information System (HMIS)

A computerized DoD database and repository of Material Safety Data Sheet (MSDS) information which provides personnel precautionary information for handling hazardous materials. Updated versions of the database are maintained by the Bioenvironmental Engineer and Base Supply. The database is generated by the Defense General Supply Center

- SSH, Petersburg, Virginia and can be reached at DSN 695-4371 or commercial (804) 279-5589.

4.0 PRIVATE ORGANIZATION AND CONTRACTORS

Melrose AFR does not have any existing arrangements with local emergency organizations and cleanup contractors to supplement in-house spill response resources and expertise. For major emergencies, additional assistance can be requested from the EPA's Regional Response Team. All requests for Regional Response Team assistance should be coordinated with the wing commander and conducted through the contracting squadron (27 SPTG/COS).

5.0 REPORTABLE SPILL NOTIFICATION REQUIREMENTS

5.1 HQ ACC LANGLEY AFB ACC/CEV Duty Hours DSN 574-3553, Environmental Coordinator Non-or Duty Hours DSN 574-2224/574-2225

HQ ACC/CEVCM should be contacted even if Base personnel are uncertain of spill classification. The purpose of the telecon is to verify spill classification when uncertainty exists and to gather available information on reportable spills to assist the initial command telecon report to HQ/CEV. As much of the following information as can be reasonably determined should be initially reported:

a. Name of installation;
b. Location of incident and local geography;
c. OSC name and telephone number;
d. Date and time of spill;
e. Type and estimated quantity of spill substance;
f. Magnitude and severity of threat to public, health, welfare and natural resources;

g. Weather conditions at the spill site;

h. Cause of incident;

i. Anticipated containment and cleanup action and effectiveness;

j. Need for assistance by National, Regional or State response teams; and,

k. Any other pertinent information.

5.2 "Reportable Spill" Notification Requirements

If spill is deemed a "Reportable Spill" by the OSC, the following additional organizations and agencies will be notified promptly following telecon notification of ACC/CEV. The notification should include as much of the information outlined in Item 1 as possible.

Federal and State Agencies:

National Response Center	(800) 424-8802
New Mexico Department of Environmental Quality Hazardous and Radioactive Waste	(505) 827-4300
EPA - Region VI	(214) 655-6776

Additional Air Force Organizations:

If spill is deemed a "Reportable Spill" by the OSC, a confirming message containing the available information outlined below must be released and transmitted to the following organizations. Environmental Flight personnel will use the WIMS-ES Spill Reporting module as the primary reporting mechanism.

HQ ACC LANGLEY AFB VA/CEV/SGPAE//HQ USAF WASH DC//CEV/SGES//HQ AFESC TYNDALL AFB FL//DEVP/PA DEMM// HQ USAF WASH DC//LEYF// (When POL is involved) HQ USAF WASH DC//RDCM// (When industrial facilities are involved) HQ USAF WASH DC//JACL

The reporting module contains prompts and the outline necessary to file an acceptable report. The following information is required to ensure that the spill is reported in an accurate and timely manner.

- Name and address of installation and/or owner;
- Name and telephone number of OSC;
- Incident report (initial, second, third, final);
- Date and time of incident;
- Time of official spill notification to the National Response Center and other regional and State officials;
- Location of incident and the nature of the terrain at the location, to include surface and subsurface drainage characteristics and relationships to water bodies (estimate extent of area affected such as miles of stream or acres of lake);
- Cause of incident;
- Type and estimated amount (barrels, gallons, pounds) of pollutant and the official size classification (minor, medium, major);
- Actual damage and/or potential threat to human life, to property (private, State, or Federal), and to plant or animal life;
- Where appropriate, include fish or wildlife affected and an estimated number killed.
- Corrective action taken to remove pollutant;
- Assistance required;

- Estimated completion date of remedial actions and anticipated effectiveness;
- Estimated quantity and disposition of spill material and contaminated soil;
- Anticipated or actual reaction by the news media and public to incident and specific potential for liability;
- Description of any problem encountered during implementation of the SPR Plan and an explanation of how the Spill Prevention Response Plan was, or will be, modified to prevent the recurrence of the spill event.
- Confirmation that emergency response equipment is back in operation before resuming operation activities;
- Description of any problems encountered during implementation of the SPR Plan and an explanation of how the Spill Prevention and Response Plan was, or will be, modified to prevent the recurrence of the spill event:
- Anticipated or actual reaction by the news media and public to the incident (Specify potential for liability in the internal Air Force reports only); and
- A copy of this SPR Plan if requested.

The information will be transmitted in message format identified in AFR 19-8 within 4 hours of telecon notification to ACC/CEV. If telecon notification is made after 1500 hours local, the message will be transmitted no later than 1000 hours the following day.

6.0 ADDITIONAL OFF-BASE SPILL RESPONSE RESOURCES

AIR FORCE AUTHORITIES
(report as appropriate)

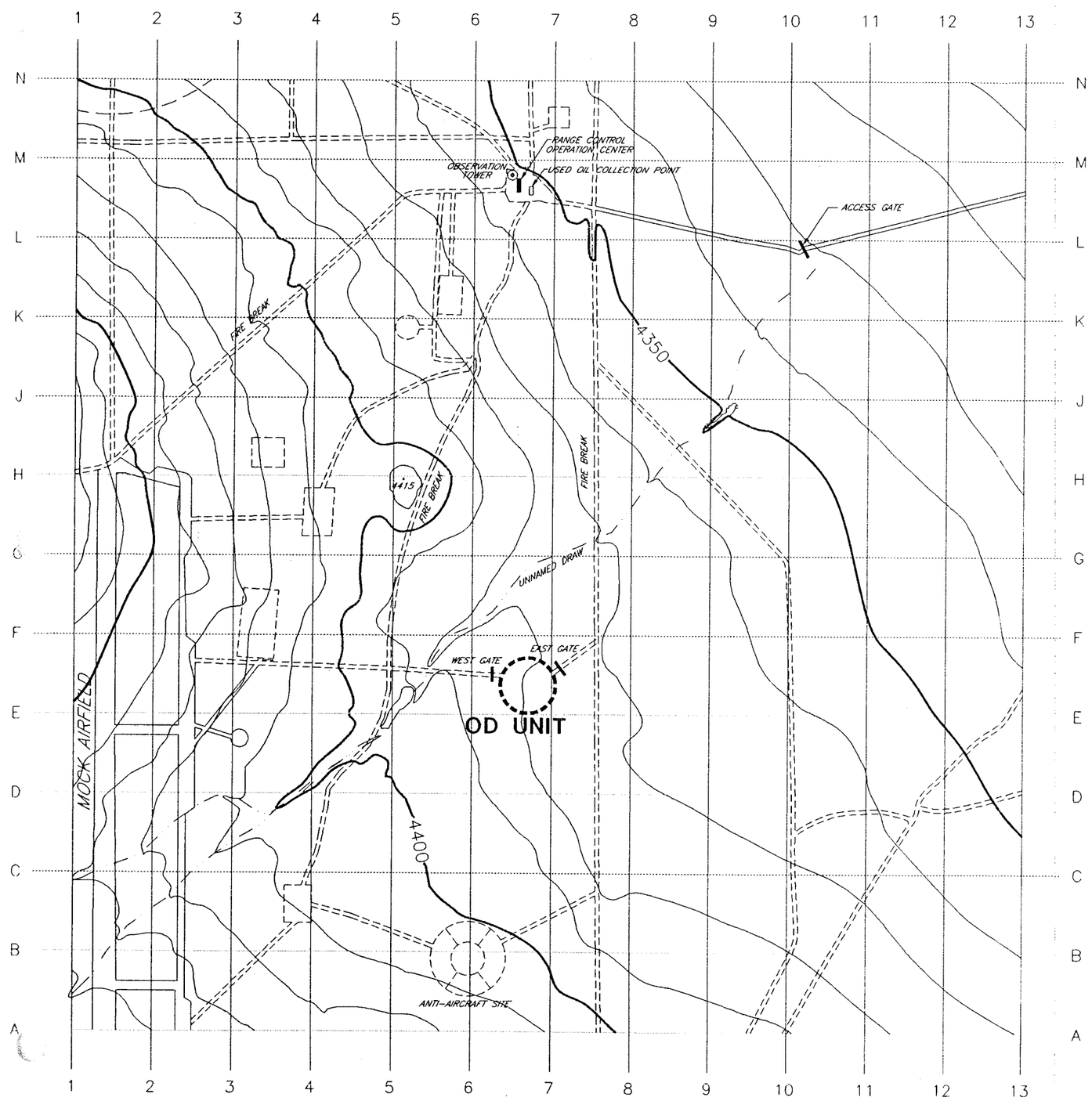
AGENCY/OFFICE SYMBOL	MESSAGE OR PHONE
Headquarters, Air Combat Command, Environmental Compliance, HQ ACC/CEVC	DSN 574-3668 (duty hours) DSN 574-3312 (non-duty hrs) Comm (804) 764-7740
FM 44SPTG GREEN AFB CA//CEV//	Message
HQ ACC LANGLEY AFB VA//CEVC//	Message
HQ USAF BOLLING AFB DC/CEVC//JACE//SGPB	Message (Information Copy)
HQ AFCESA TYNDALL AFB FL//PA//DEMM//	Message
HQ ACC LANGLEY AFB VA//SGPB//	Message
HQ USAF PENTAGON WASH DC//LGSS//	Message (POL spills only)
AFCEE SAN FRANCISCO CA//ESS//	Message (Your appropriate RCO)
SAF PENTAGON WASH DC//AQCM//	Message (When GOCO Facilities are involved)

ANNEX V

RANGE MAP

ANNEX VI

HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES



NORTH

LEGEND

- UNIMPROVED DIRT ROADS
- SECONDARY PAVED ROADS
- 4300 CONTOUR INTERVALS (10 FEET)
- INTERMITTANT STREAM
- OBSERVATION TOWER

1500' 0' 1500'

Scale: 1" = 1500'

REV NO.	ISSUE OR REVISION – DESCRIPTION	REV BY	REV DATE

RADIAN CORPORATION
ENGINEERING AND ENVIRONMENTAL TECHNOLOGY SERVICES
120 S. JEFFERSON CIRCLE
OAK RIDGE, TENNESSEE

DRAWING TITLE

MELROSE AIR FORCE RANGE OD AREA GRID

SCALE 1" = 1500'

DRAWN BY	DATE	DESIGNED BY	DATE
W. MEAD	2-16-94	W. HOWELL	2-16-94
CHECKED BY	DATE	APPROVED BY	DATE
W. HOWELL	2-16-94	W. HOWELL	2-16-94

PROJECT NO.	DRAWING NUMBER	REV	SHT	OF
2642051201			1	1

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
Acenaphthene	83329		1*	2		B	100 (45.4)
Acenaphthylene	208968		1*	2		D	5000 (2270)
Acetaldehyde	75070	Ethanal	1000	1,4	U001	C	1000 (454)
Acetaldehyde, chloro-	107200	Chloroacetaldehyde	1*	4	P023	C	1000 (454)
Acetaldehyde, trichloro-	75876	Chloral	1*	4	U034	D	5000 (2270)
Acetamide, N-(aminothioxomethyl)-	591082	1-Acetyl-2-thiourea	1*	4	P002	C	1000 (454)
Acetamide, N-(4-ethoxyphenyl)-	62442	Phenacetin	1*	4	U187	B	100 (45.4)
Acetamide, 2-fluoro-	640197	Fluoroacetamide	1*	4	P057	B	100 (45.4)
Acetamide, N-9H-fluoren-2-yl-	53963	2-Acetylaminofluorene	1*	4	U005	X	1 (0.454)
Acetic acid	64197		1000	1		D	5000 (2270)
Acetic acid (2,4-dichlorophenoxy)-	94757	2,4-D Acid 2,4-D, salts and esters	100	1,4	U240	B	100 (45.4)
Acetic acid, lead(2+) salt	301042	Lead acetate	5000	1,4	U144		*
Acetic acid, thallium(1+) salt	563688	Thallium(I) acetate	1*	4	U214	B	100 (45.4)
Acetic acid, (2,4,5-trichlorophenoxy)	93765	2,4,5-T 2,4,5-T acid	100	1,4	U232	C	1000 (454)
Acetic acid, ethyl ester	141786	Ethyl acetate	1*	4	U112	D	5000 (2270)
Acetic acid, fluoro-, sodium salt	62748	Fluoroacetic acid, sodium salt	1*	4	P058	A	10 (4.54)
Acetic anhydride	108247		1000	1		D	5000 (2270)
Acetone	67641	2-Propanone	1*	4	U002	D	5000 (2270)
Acetone cyanohydrin	75865	Propanenitrile, 2-hydroxy-2-methyl-2-Methylactonitrile	10	1,4	P069	A	10 (4.54)
Acetonitrile	75058		1*	4	U003	D	5000 (2270)
Acetophenone	98862	Ethanone, 1-phenyl-	1*	4	U004	D	5000 (2270)
2-Acetylaminofluorene	53963	Acetamide, N-9H-fluoren-2-yl-	1*	4	U005	X	1 (0.454)
Acetyl bromide	506967		5000	1		D	5000 (2270)
Acetyl chloride	75365		5000	1,4	U006	D	5000 (2270)
1-Acetyl-2-thiourea	591082	Acetamide, N-(aminothioxomethyl)-	1*	4	P002	C	1000 (454)
Acrolein	107028	2-Propenal	1	1,2,4	P003	X	1 (0.454)
Acrylamide	79061	2-Propenamide	1*	4	U007	D	5000 (2270)
Acrylic acid	79107	2-Propenoic acid	1*	4	U008	D	5000 (2270)
Acrylonitrile	107131	2-Propenenitrile	100	1,2,4	U009	B	100 (45.4)
Adipic acid	124049		5000	1		D	5000 (2270)
Aldicarb	116063	Propanal, 2-methyl-2-(methylthio)-,O-[(methylamino)carbonyl]oxime	1*	4	P070	X	1 (0.454)
Aldrin	309002	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha, 4alpha,4abeta,5alpha,8alpha,8abeta)-	1	1,2,4	P004	X	1 (0.454)
Allyl alcohol	107186	2-Propen-1-ol	100	1,4	P005	B	100 (45.4)
Allyl chloride	107051		1000	1		C	1000 (454)
Aluminum phosphide	20859738		1*	4	P006	B	100 (45.4)
Aluminum sulfate	10043013		5000	1		D	5000 (2270)
5-(Aminomethyl)-3-isoxazolol	2763964	Muscimol 3(2H)-Isoxazolone, 5-(aminomethyl)-	1*	4	P007	C	1000 (454)
4-Aminopyridine	504245	4-Pyridinamine	1*	4	P008	C	1000 (454)
Amitrole	61825	1H-1,2,4-Triazol-3-amine	1*	4	U011	A	10 (4.54)
Ammonia	7664417		100	1		B	100 (45.4)
Ammonium acetate	631618		5000	1		D	5000 (2270)
Ammonium benzoate	1863634		5000	1		D	5000 (2270)
Ammonium bicarbonate	1066337		5000	1		D	5000 (2270)
Ammonium bichromate	7789095		1000	1		A	10 (4.54)
Ammonium bifluoride	1341497		5000	1		B	100 (45.4)
Ammonium bisulfite	10192300		5000	1		D	5000 (2270)
Ammonium carbamate	1111780		5000	1		D	5000 (2270)
Ammonium carbonate	506876		5000	1		D	5000 (2270)
Ammonium chloride	12125029		5000	1		D	5000 (2270)
Ammonium chromate	7788989		1000	1		A	10 (4.54)
Ammonium citrate, dibasic	3012655		5000	1		D	5000 (2270)
Ammonium fluoborate	13826830		5000	1		D	5000 (2270)
Ammonium fluoride	12125018		5000	1		B	100 (45.4)
Ammonium hydroxide	1336216		1000	1		C	1000 (454)
Ammonium oxalate	6009707		5000	1		D	5000 (2270)
	5972736						
	14258492						
Ammonium picrate	131748	Phenol, 2,4,6-trinitro-, ammonium salt	1*	4	P009	A	10 (4.54)
Ammonium silicofluoride	16919190		1000	1		C	1000 (454)
Ammonium sulfamate	7773060		5000	1		D	5000 (2270)
Ammonium sulfide	12135761		5000	1		B	100 (45.4)
Ammonium sulfite	10196040		5000	1		D	5000 (2270)
Ammonium tartrate	14307438		5000	1		D	5000 (2270)
	3164292						
Ammonium thiocyanate	1762954		5000	1		D	5000 (2270)
Ammonium vanadate	7803556	Vanadic acid, ammonium salt	1*	4	P119	C	1000 (454)
Amyl acetate	628637		1000	1		D	5000 (2270)
iso-Amyl acetate	123922						
sec-Amyl acetate	626380						
tert-Amyl acetate	625161						
Aniline	62533	Benzenamine	1000	1,4	U012	D	5000 (2270)
Anthracene	120127		1*	2		D	5000 (2270)
Antimony ††	7440360		1*	2		D	5000 (2270)
ANTIMONY AND COMPOUNDS	N.A.		1*	2			**
Antimony pentachloride	7647189		1000	1		C	1000 (454)
Antimony potassium tartrate	28300745		1000	1		B	100 (45.4)
Antimony tribromide	7789619		1000	1		C	1000 (454)
Antimony trichloride	10025919		1000	1		C	1000 (454)
Antimony trifluoride	7783564		1000	1		C	1000 (454)
Antimony trioxide	1309644		5000	1		C	1000 (454)
Argentate(1-), bis(cyano-C)-, potassium	506616	Potassium silver cyanide	1*	4	P099	X	1 (0.454)
Aroclor 1016	12674112	POLYCHLORINATED BIPHENYLS (PCBs)	10	1,2		X	1 (0.454)
Aroclor 1221	11104282	POLYCHLORINATED BIPHENYLS (PCBs)	10	1,2		X	1 (0.454)
Aroclor 1232	11141165	POLYCHLORINATED BIPHENYLS (PCBs)	10	1,2		X	1 (0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Final RQ * Category	Final RQ * Pounds (Kg)
Aroclor 1242	53469219	POLYCHLORINATED BIPHENYLS (PCBs)	10	1,2		X	1 (0.454)
Aroclor 1248	12672296	POLYCHLORINATED BIPHENYLS (PCBs)	10	1,2		X	1 (0.454)
Aroclor 1254	11097691	POLYCHLORINATED BIPHENYLS (PCBs)	10	1,2		X	1 (0.454)
Aroclor 1260	11096825	POLYCHLORINATED BIPHENYLS (PCBs)	10	1,2		X	1 (0.454)
Arsenic TT	7440382		1*	2,3		X	* (0.454)
Arsenic acid	1327522 7778394	Arsenic acid H3AsO4	1*	4	P010	X	1 (0.454)
Arsenic acid H3AsO4	1327522 7778394	Arsenic acid	1*	4	P010	X	1 (0.454)
ARSENIC AND COMPOUNDS	N.A.		1*	2			**
Arsenic disulfide	1303328		5000	1		X	1 (0.454)
Arsenic oxide As2O3	1327533	Arsenic trioxide	5000	1,4	P012	X	1 (0.454)
Arsenic oxide As2O5	1303282	Arsenic pentoxide	5000	1,4	P011	X	1 (0.454)
Arsenic pentoxide	1303282	Arsenic oxide As2O5	5000	1,4	P011	X	1 (0.454)
Arsenic trichloride	7784341		5000	1		X	1 (0.454)
Arsenic trioxide	1327533	Arsenic oxide As2O3	5000	1,4	P012	X	1 (0.454)
Arsenic trisulfide	1303339		5000	1		X	1 (0.454)
Arsine, diethyl-	692422	Diethylarsine	1*	4	P038	X	1 (0.454)
Arsinic acid, dimethyl-	75605	Cacodylic acid	1*	4	U136	X	1 (0.454)
Arsonous dichloride, phenyl-	696286	Dichlorophenylarsine	1*	4	P036	X	1 (0.454)
Asbestos TTT	1332214		1*	2,3		X	1 (0.454)
Auramine	492808	Benzenamine, 4,4'-carbonimidoylbis (N,N-dimethyl-	1*	4	U014	B	100 (45.4)
Azaserine	115026	L-Serine, diazoacetate (ester)	1*	4	U015	X	1 (0.454)
Aziridine	151564	Ethylenimine	1*	4	P054	X	1 (0.454)
Aziridine, 2-methyl-	75558	1,2-Propylenimine	1*	4	P067	X	1 (0.454)
Azirino[2',3':3,4]pyrrolo[1,2-a]indole-4,7-dione,6-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-,[1aS-(1aalpha,8beta,8aalpha,8balpha)]-	50077	Mitomycin C	1*	4	U010	A	10 (4.54)
Barium cyanide	542621		10	1,4	P013	A	10 (4.54)
Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	56495	3-Methylcholanthrene	1*	4	U157	A	10 (4.54)
Benz[c]acridine	225514		1*	4	U016	B	100 (45.4)
Benzal chloride	98873	Benzene, dichloromethyl-	1*	4	U017	D	5000 (2270)
Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	23950585	Pronamide	1*	4	U192	D	5000 (2270)
Benz[a]anthracene	56553	Benzo[a]anthracene 1,2-Benzanthracene	1*	2,4	U018	A	10 (4.54)
1,2-Benzanthracene	56553	Benz[a]anthracene Benzo[a]anthracene	1*	2,4	U018	A	10 (4.54)
Benz[a]anthracene, 7,12-dimethyl-	57976	7,12-Dimethylbenz[a]anthracene	1*	4	U094	X	* (0.454)
Benzenamine	62533	Aniline	1000	1,4	U012	D	5000 (2270)
Benzenamine, 4,4'-carbonimidoylbis (N,N-dimethyl-	492808	Auramine	1*	4	U014	B	100 (45.4)
Benzenamine, 4-chloro-	106478	p-Chloroaniline	1*	4	P024	C	1000 (454)
Benzenamine, 4-chloro-2-methyl-, hydrochloride	3165933	4-Chloro-o-toluidine, hydrochloride	1*	4	U049	B	100 (45.4)
Benzenamine, N,N-dimethyl-4-(phenylazo)-	60117	p-Dimethylaminoazobenzene	1*	4	U093	A	10 (4.54)
Benzenamine, 2-methyl-	95534	o-Toluidine	1*	4	U328	B	100 (45.4)
Benzenamine, 4-methyl-	106490	p-Toluidine	1*	4	U353	B	100 (45.4)
Benzenamine, 4,4'-methylenebis(2-chloro-	101144	4,4'-Methylenebis(2-chloroaniline)	1*	4	U158	A	10 (4.54)
Benzenamine, 2-methyl-, hydrochloride	636215	o-Toluidine hydrochloride	1*	4	U222	B	100 (45.4)
Benzenamine, 2-methyl-5-nitro-	99558	5-Nitro-o-toluidine	1*	4	U181	B	100 (45.4)
Benzenamine, 4-nitro-	100016	p-Nitroaniline	1*	4	P077	D	5000 (2270)
Benzene	71432		1000	1,2,3,4	U109	A	10 (4.54)
Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	510156	Chlorobenzilate	1*	4	U038	A	10 (4.54)
Benzene, 1-bromo-4-phenoxy-	101553	4-Bromophenyl phenyl ether	1*	2,4	U030	B	100 (45.4)
Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-	305033	Chlorambucil	1*	4	U035	A	10 (4.54)
Benzene, chloro-	108907	Chlorobenzene	100	1,2,4	U037	B	100 (45.4)
Benzene, chloromethyl-	100447	Benzyl chloride	100	1,4	P028	B	100 (45.4)
Benzenediamin, ar-methyl-	95807 496720 823405	Toluenediamine	1*	4	U221	A	10 (4.54)
1,2-Benzenedicarboxylic acid, dioctyl ester	117840	Di-n-octyl phthalate	1*	2,4	U107	D	5000 (2270)
1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)]-ester,	117817	Bis (2-ethylhexyl)phthalate Diethylhexyl phthalate	1*	2,4	U028	B	100 (45.4)
1,2-Benzenedicarboxylic acid, dibutyl ester	84742	Di-n-butyl phthalate Dibutyl phthalate n-Butyl phthalate	100	1,2,4	U069	A	10 (4.54)
1,2-Benzenedicarboxylic acid, diethyl ester	84662	Diethyl phthalate	1*	2,4	U088	C	1000 (454)
1,2-Benzenedicarboxylic acid, dimethyl ester	131113	Dimethyl phthalate	1*	2,4	U102	D	5000 (2270)
Benzene, 1,2-dichloro-	95501	o-Dichlorobenzene 1,2-Dichlorobenzene	100	1,2,4	U070	B	100 (45.4)
Benzene, 1,3-dichloro-	541731	m-Dichlorobenzene 1,3-Dichlorobenzene	1*	2,4	U071	B	100 (45.4)
Benzene, 1,4-dichloro-	106467	p-Dichlorobenzene 1,4-Dichlorobenzene	100	1,2,4	U072	B	100 (45.4)
Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-	72548	DDD TDE 4,4' DDD	1	1,2,4	U060	X	1 (0.454)
Benzene, dichloromethyl-	98873	Benzal chloride	1*	4	U017	D	5000 (2270)
Benzene, 1,3-diisocyanatomethyl-	584849 91087 26471625	Toluene diisocyanate	1*	4	U223	B	100 (45.4)
Benzene, dimethyl-	1330207	Xylene (mixed)	1000	1,4	U239	C	1000 (454)
m-Benzene, dimethyl-	108383	m-Xylene					
o-Benzene, dimethyl-	95476	o-Xylene					
p-Benzene, dimethyl-	106423	p-Xylene					
1,3-Benzenediol	108463	Resorcinol	1000	1,4	U201	D	5000 (2270)
1,2-Benzenediol,4-[1-hydroxy-2-(methylamino)ethyl]-	51434	Epinephrine	1*	4	P042	C	1000 (454)
Benzeneethanamine, alpha,alpha-dimethyl-	122098	alpha,alpha-Dimethylphenethylamine	1*	4	P046	D	5000 (2270)
Benzene, hexachloro-	118741	Hexachlorobenzene	1*	2,4	U127	A	10 (4.54)
Benzene, hexahydro-	110827	Cyclohexane	1000	1,4	U056	C	1000 (454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
Benzene, hydroxy-	108952	Phenol	1000	1,2,4	U188	C	1000 (454)
Benzene, methyl-	108883	Toluene	1000	1,2,4	U220	C	1000 (454)
Benzene, 2-methyl-1,3-dinitro-	606202	2,6-Dinitrotoluene	1000	1,2,4	U106	B	100 (45.4)
Benzene, 1-methyl-2,4-dinitro-	121142	2,4-Dinitrotoluene	1000	1,2,4	U105	A	10 (4.54)
Benzene, 1-methylethyl-	98828	Cumene	1*	4	U055	D	5000 (2270)
Benzene, nitro-	98953	Nitrobenzene	1000	1,2,4	U169	C	1000 (454)
Benzene, pentachloro-	608935	Pentachlorobenzene	1*	4	U183	A	10 (4.54)
Benzene, pentachloronitro-	82688	Pentachloronitrobenzene (PCNB)	1*	4	U185	B	100 (45.4)
Benzenesulfonic acid chloride	98099	Benzenesulfonyl chloride	1*	4	U020	B	100 (45.4)
Benzenesulfonyl chloride	98099	Benzenesulfonic acid chloride	1*	4	U020	B	100 (45.4)
Benzene, 1,2,4,5-tetrachloro-	95943	1,2,4,5-Tetrachlorobenzene	1*	4	U207	D	5000 (2270)
Benzenethiol	108985	Thiophenol	1*	4	P014	B	100 (45.4)
Benzene, 1,1'-(2,2,2-tri- chloroethylidene)bis(4- chloro-	50293	DDT 4,4'DDT	1	1,2,4	U061	X	1 (0.454)
Benzene, 1,1'-(2,2,2-trichloroethylidene) bis(4-meth- oxy-	72435	Methoxychlor	1	1,4	U247	X	1 (0.454)
Benzene, (trichloromethyl)-	98077	Benzotrichloride	1*	4	U023	A	10 (4.54)
Benzene, 1,3,5-trinitro-	99354	1,3,5-Trinitrobenzene	1*	4	U234	A	10 (4.54)
Benzidine	92875	(1,1'-Biphenyl)-4,4'-diamine	1*	2,4	U021	X	1 (0.454)
1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide	81072	Saccharin and salts	1*	4	U202	B	100 (45.4)
Benzo(a)anthracene	56553	Benz(a)anthracene 1,2-Benzanthracene	1*	2,4	U018	A	10 (4.54)
Benzo(b)fluoranthene	205992		1*	2		X	1 (0.454)
Benzo(k)fluoranthene	207089		1*	2		D	5000 (2270)
Benzo(j,k)fluorene	206440	Fluoranthene	1*	2,4	U120	B	100 (45.4)
1,3-Benzodioxole, 5-(1-propenyl)-	120581	Isosafrole	1*	4	U141	B	100 (45.4)
1,3-Benzodioxole,5-(2-propenyl)-	94597	Safrole	1*	4	U203	B	100 (45.4)
1,3-Benzodioxole, 5-propyl-	94586	Dihydrosafrole	1*	4	U090	A	10 (4.54)
Benzoic acid	65850		5000	1		D	5000 (2270)
Benzonitrile	100470		1000	1		D	5000 (2270)
Benzo [rst]pentaphene	189559	Dibenz(a,i)pyrene	1*	4	U064	A	10 (4.54)
Benzo(ghi)perylene	191242		1*	2		D	5000 (2270)
2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1- phenyl-butyl)-, & salts, when present at concen- trations greater than 0.3%	81812	Warfarin, & salts, when present at concentrations greater than 0.3%	1*	4	P001	B	100 (45.4)
Benzo(a)pyrene	50328	3,4-Benzopyrene	1*	2,4	U022	X	1 (0.454)
3,4-Benzopyrene	50328	Benzo(a)pyrene	1*	2,4	U022	X	1 (0.454)
p-Benzoquinone	106514	2,5-Cyclohexadiene-1,4-dione	1*	4	U197	A	10 (4.54)
Benzotrichloride	98077	Benzene, (trichloromethyl)-	1*	4	U023	A	10 (4.54)
Benzoyl chloride	98884		1000	1		C	1000 (454)
1,2-Benzphenanthrene	218019	Chrysene	1*	2,4	U050	B	100 (45.4)
Benzyl chloride	100447	Benzene, chloromethyl-	100	1,4	P028	B	100 (45.4)
Beryllium ††	7440417	Beryllium dust ††	1*	2,3,4	P015	A	10 (4.54)
BERYLLIUM AND COMPOUNDS	N.A.		1*	2			**
Beryllium chloride	7787475		5000	1		X	1 (0.454)
Beryllium dust ††	7440417	Beryllium ††	1*	2,3,4	P015	A	10 (4.54)
Beryllium fluoride	7787497		5000	1		X	1 (0.454)
Beryllium nitrate	13597994 7787555		5000	1		X	1 (0.454)
alpha—BHC	319846		1*	2		A	10 (4.54)
beta—BHC	319857		1*	2		X	1 (0.454)
delta—BHC	319868		1*	2		X	1 (0.454)
gamma—BHC	58899	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1alpha, 2alpha,3beta,4alpha,5alpha,6beta)- Hexachlorocyclohexane (gamma isomer) Lindane	1	1,2,4	U129	X	1 (0.454)
2,2'-Bioxirane	1464535	1,2:3,4-Diepoxybutane	1*	4	U085	A	10 (4.54)
(1,1'-Biphenyl)-4,4'-diamine	92875	Benzidine	1*	2,4	U021	X	1 (0.454)
[1,1'-Biphenyl]-4,4'-diamine,3,3'-dichloro-	91941	3,3'-Dichlorobenzidine	1*	2,4	U073	X	1 (0.454)
[1,1'-Biphenyl]-4,4'-diamine,3,3'-dimethoxy-	119904	3,3'-Dimethoxybenzidine	1*	4	U091	B	100 (45.4)
[1,1'-Biphenyl]-4,4'-diamine,3,3'-dimethyl-	119937	3,3'-Dimethylbenzidine	1*	4	U095	A	10 (4.54)
Bis (2-chloroethyl) ether	111444	Dichloroethyl ether Ethane,1,1'-oxybis[2-chloro-	1*	2,4	U025	A	10 (4.54)
Bis(2-chloroethoxy) methane	111911	Dichloromethoxy ethane Ethane, 1,1'-[methylenebis(oxy)]bis(2-chloro-	1*	2,4	U024	C	1000 (454)
Bis (2-ethylhexyl)phthalate	117817	Diethylhexyl phthalate 1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)] ester	1*	2,4	U028	B	100 (45.4)
Bromoacetone	598312	2-Propanone, 1-bromo-	1*	4	P017	C	1000 (454)
Bromoform	75252	Methane, tribromo-	1*	2,4	U225	B	100 (45.4)
4-Bromophenyl phenyl ether	101553	Benzene, 1-bromo-4-phenoxy-	1*	2,4	U030	B	100 (45.4)
Brucine	357573	Strychnidin-10-one, 2,3-dimethoxy-	1*	4	P018	B	100 (45.4)
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87683	Hexachlorobutadiene	1*	2,4	U128	X	1 (0.454)
1-Butanamine, N-butyl-N-nitroso-	924163	N-Nitroso-n-butylamine	1*	4	U172	A	10 (4.54)
1-Butanol	71363	n-Butyl alcohol	1*	4	U031	D	5000 (2270)
2-Butanone	78933	Methyl ethyl ketone (MEK)	1*	4	U159	D	5000 (2270)
2-Butanone peroxide	1338234	Methyl ethyl ketone peroxide	1*	4	U160	A	10 (4.54)
2-Butanone, 3,3-dimethyl-1-(methylthio)-, O[(methylamino)carbonyl] oxime.	39196184	Thiofanox	1*	4	P045	B	100 (45.4)
2-Butenal	123739 4170303	Crotonaldehyde	100	1,4	U053	B	100 (45.4)
2-Butene, 1,4-dichloro-	764410	1,4-Dichloro-2-butene	1*	4	U074	X	1 (0.454)
2-Butenoic acid, 2-methyl-, 7[[2,3-dihydroxy-2-(1- methoxyethyl)-3-methyl-1-oxobutoxy]methyl]- 2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S- [1alpha(Z),7(2S*,3R*),7aalpha]]-	303344	Lasiocarpine	1*	4	U143	A	10 (4.54)
Butyl acetate	123864		5000	1		D	5000 (2270)
iso-Butyl acetate	110190						
sec-Butyl acetate	105464						
tert-Butyl acetate	540885						
n-Butyl alcohol	71363	1-Butanol	1*	4	U031	D	5000 (2270)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
Butylamine	109739		1000	1		C	1000 (454)
iso-Butylamine	78819						
sec-Butylamine	513495						
	13952846						
tert-Butylamine	75649						
Butyl benzyl phthalate	85687		1*	2		B	100 (45.4)
n-Butyl phthalate	84742	Di-n-butyl phthalate Dibutyl phthalate 1,2-Benzenedicarboxylic acid, dibutyl ester	100	1,2,4	U069	A	10 (4.54)
Butyric acid	107926		5000	1		D	5000 (2270)
iso-Butyric acid	79312						
Cacodylic acid	75605	Arsinic acid, dimethyl-	1*	4	U136	X	1 (0.454)
Cadmium **	7440439		1*	2		A	10 (4.54)
Cadmium acetate	543908		100	1		A	10 (4.54)
CADMIUM AND COMPOUNDS	N.A.		1*	2			**
Cadmium bromide	7789426		100	1		A	10 (4.54)
Cadmium chloride	10108642		100	1		A	10 (4.54)
Calcium arsenate	7778441		1000	1		X	1 (0.454)
Calcium arsenite	52740166		1000	1		X	1 (0.454)
Calcium carbide	75207		5000	1		A	10 (4.54)
Calcium chromate	13765190	Chromic acid H2CrO4, calcium salt	1000	1,4	U032	A	10 (4.54)
Calcium cyanide	592018	Calcium cyanide Ca(CN)2	10	1,4	P021	A	10 (4.54)
Calcium cyanide Ca(CN)2	592018	Calcium cyanide	10	1,4	P021	A	10 (4.54)
Calcium dodecylbenzenesulfonate	26264062		1000	1		C	1000 (454)
Calcium hypochlorite	7778543		100	1		A	10 (4.54)
Camphene, octachloro-	8001352	Toxaphene	1	1,2,4	P123	X	1 (0.454)
Captan	133062		10	1		A	10 (4.54)
Carbamic acid, ethyl ester	51796	Ethyl carbamate (urethane)	1*	4	U238	B	100 (45.4)
Carbamic acid, methylnitroso-, ethyl ester	615532	N-Nitroso-N-methylurethane	1*	4	U178	X	1 (0.454)
Carbamic chloride, dimethyl-	79447	Dimethylcarbamoyl chloride	1*	4	U097	X	1 (0.454)
Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters	111546	Ethylenebisdithiocarbamic acid, salts & esters	1*	4	U114	D	5000 (2270)
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	2303164	Diallate	1*	4	U062	B	100 (45.4)
Carbaryl	63252		100	1		B	100 (45.4)
Carbofuran	1563662		10	1		A	10 (4.54)
Carbon disulfide	75150		5000	1,4	P022	B	100 (45.4)
Carbon oxyfluoride	353504	Carbonic difluoride	1*	4	U033	C	1000 (454)
Carbon tetrachloride	56235	Methane, tetrachloro-	5000	1,2,4	U211	A	10 (4.54)
Carbonic acid, dithallium(1+) salt	6533739	Thallium(I) carbonate	1*	4	U215	B	100 (45.4)
Carbonic dichloride	75445	Phosgene	5000	1,4	P095	A	10 (4.54)
Carbonic difluoride	353504	Carbon oxyfluoride	1*	4	U033	C	1000 (454)
Carbonochloridic acid, methyl ester	79221	Methyl chlorocarbonate Methyl chloroformate	1*	4	U156	C	1000 (454)
Chloral	75876	Acetaldehyde, trichloro-	1*	4	U034	D	5000 (2270)
Chlorambucil	305033	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-	1*	4	U035	A	10 (4.54)
Chlordane	57749	Chlordane, alpha & gamma isomers Chlordane, technical 4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	1	1,2,4	U036	X	1 (0.454)
CHLORDANE (TECHNICAL MIXTURE AND METABOLITES)	N.A.		1*	2			**
Chlordane, alpha & gamma isomers	57749	Chlordane Chlordane, technical 4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	1	1,2,4	U036	X	1 (0.454)
Chlordane, technical	57749	Chlordane Chlordane, alpha & gamma isomers 4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	1	1,2,4	U036	X	1 (0.454)
CHLORINATED BENZENES	N.A.		1*	2			**
CHLORINATED ETHANES	N.A.		1*	2			**
CHLORINATED NAPHTHALENE	N.A.		1*	2			**
CHLORINATED PHENOLS	N.A.		1*	2			**
Chlorine	7782505		10	1		A	10 (4.54)
Chlornaphazine	494031	Naphthalenamine, N,N'-bis(2-chloroethyl)-	1*	4	U026	B	100 (45.4)
Chloroacetaldehyde	107200	Acetaldehyde, chloro-	1*	4	P023	C	1000 (454)
CHLOROALKYL ETHERS	N.A.		1*	2			**
p-Chloroaniline	106478	Benzenamine, 4-chloro-	1*	4	P024	C	1000 (454)
Chlorobenzene	108907	Benzene, chloro-	100	1,2,4	U037	B	100 (45.4)
Chlorobenzilate	510156	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	1*	4	U038	A	10 (4.54)
4-Chloro-m-cresol	59507	p-Chloro-m-cresol Phenol, 4-chloro-3-methyl-	1*	2,4	U039	D	5000 (2270)
p-Chloro-m-cresol	59507	Phenol, 4-chloro-3-methyl- 4-Chloro-m-cresol	1*	2,4	U039	D	5000 (2270)
Chlorodibromomethane	124481		1*	2		B	100 (45.4)
Chloroethane	75003		1*	2		B	100 (45.4)
2-Chloroethyl vinyl ether	110758	Ethene, 2-chloroethoxy-	1*	2,4	U042	C	1000 (454)
Chloroform	67663	Methane, trichloro-	5000	1,2,4	U044	A	10 (4.54)
Chloromethyl methyl ether	107302	Methane, chloromethoxy-	1*	4	U046	A	10 (4.54)
beta-Chloronaphthalene	91587	Naphthalene, 2-chloro- 2-Chloronaphthalene	1*	2,4	U047	D	5000 (2270)
2-Chloronaphthalene	91587	beta-Chloronaphthalene Naphthalene, 2-chloro-	1*	2,4	U047	D	5000 (2270)
2-Chlorophenol	95578	o-Chlorophenol Phenol, 2-chloro-	1*	2,4	U048	B	100 (45.4)
o-Chlorophenol	95578	Phenol, 2-chloro- 2-Chlorophenol	1*	2,4	U048	B	100 (45.4)
4-Chlorophenyl phenyl ether	7005723		1*	2		D	5000 (2270)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
1-(o-Chlorophenyl)thiourea	5344821	Thiourea, (2-chlorophenyl)-	1*	4	P026	B	100 (45.4)
3-Chloropropionitrile	542767	Propanenitrile, 3-chloro-	1*	4	P027	C	1000 (454)
Chlorosulfonic acid	7790945		1000	1		C	1000 (454)
4-Chloro-o-toluidine, hydrochloride	3165933	Benzenamine, 4-chloro-2-methyl-, hydrochloride	1*	4	U049	B	100 (45.4)
Chlorpyrifos	2921882		1	1		X	1 (0.454)
Chromic acetate	1066304		1000	1		C	1000 (454)
Chromic acid	11115745		1000	1		A	10 (4.54)
	7738945						
Chromic acid H2CrO4, calcium salt	13765190	Calcium chromate	1000	1,4	U032	A	10 (4.54)
Chromic sulfate	10101538		1000	1		C	1000 (454)
Chromium TT	7440473		1*	2		D	5000 (2270)
CHROMIUM AND COMPOUNDS	N.A.		1*	2			**
Chromous chloride	10049055		1000	1		C	1000 (454)
Chrysene	218019	1,2-Benzophenanthrene	1*	2,4	U050	B	100 (45.4)
Cobaltous bromide	7789437		1000	1		C	1000 (454)
Cobaltous formate	544183		1000	1		C	1000 (454)
Cobaltous sulfamate	14017415		1000	1		C	1000 (454)
Coke Oven Emissions	N.A.		1*	3		X	1 (0.454)
Copper cyanide CuCN	544923	Copper cyanide	1*	4	P029	A	10 (4.54)
Copper TT	7440508		1*	2		D	5000 (2270)
COPPER AND COMPOUNDS	N.A.		1*	2			**
Copper cyanide	544923	Copper cyanide CuCN	1*	4	P029	A	10 (4.54)
Coumaphos	56724		10	1		A	10 (4.54)
Creosote	8001589		1*	4	U051	X	1 (0.454)
Cresol(s)	1319773	Cresylic acid Phenol, methyl-	1000	1,4	U052	C	1000 (454)
m-Cresol	108394	m-Cresylic acid					
o-Cresol	95487	o-Cresylic acid					
p-Cresol	106445	p-Cresylic acid					
Cresylic acid	1319773	Cresol(s) Phenol, methyl-	1000	1,4	U052	C	1000 (454)
m-Cresol	108394	m-Cresylic acid					
o-Cresol	95487	o-Cresylic acid					
p-Cresol	106445	p-Cresylic acid					
Crotonaldehyde	123739	2-Butenal	100	1,4	U053	B	100 (45.4)
	4170303						
Cumene	98828	Benzene, 1-methylethyl-	1*	4	U055	D	5000 (2270)
Cupric acetate	142712		100	1		B	100 (45.4)
Cupric acetoarsenite	12002038		100	1		X	1 (0.454)
Cupric chloride	7447394		10	1		A	10 (4.54)
Cupric nitrate	3251238		100	1		B	100 (45.4)
Cupric oxalate	5893663		100	1		B	100 (45.4)
Cupric sulfate	7758987		10	1		A	10 (4.54)
Cupric sulfate, ammoniated	10380297		100	1		B	100 (45.4)
Cupric tartrate	815827		100	1		B	100 (45.4)
CYANIDES	N.A.		1*	2			**
Cyanides (soluble salts and complexes) not otherwise specified	57125		1*	4	P030	A	10 (4.54)
Cyanogen	460195	Ethanedinitrile	1*	4	P031	B	100 (45.4)
Cyanogen bromide	506683	Cyanogen bromide (CN)Br	1*	4	U246	C	1000 (454)
Cyanogen bromide (CN)Br	506683	Cyanogen bromide	1*	4	U246	C	1000 (454)
Cyanogen chloride	506774	Cyanogen chloride (CN)Cl	10	1,4	P033	A	10 (4.54)
Cyanogen chloride (CN)Cl	506774	Cyanogen chloride	10	1,4	P033	A	10 (4.54)
2,5-Cyclohexadiene-1,4-dione	106514	p-Benzoquinone	1*	4	U197	A	10 (4.54)
Cyclohexane	110827	Benzene, hexahydro-	1000	1,4	U056	C	1000 (454)
Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha, 6beta)-	58899	gamma—BHC Hexachlorocyclohexane (gamma isomer) Lindane	1	1,2,4	U129	X	1 (0.454)
Cyclohexanone	108941		1*	4	U057	D	5000 (2270)
2-Cyclohexyl-4,6-dinitrophenol	131895	Phenol, 2-cyclohexyl-4,6-dinitro-	1*	4	P034	B	100 (45.4)
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	77474	Hexachlorocyclopentadiene	1	1,2,4	U130	A	10 (4.54)
Cyclophosphamide	50180	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-,2-oxide	1*	4	U058	A	10 (4.54)
2,4-D Acid	94757	Acetic acid (2,4-dichlorophenoxy)-2,4-D. salts and esters	100	1,4	U240	B	100 (45.4)
2,4-D Ester	94111		100	1		B	100 (45.4)
	94791						
	94804						
	1320189						
	1928387						
	1928616						
	1929733						
	2971382						
	25168267						
	53467111						
2,4-D, salts and esters	94757	Acetic acid (2,4-dichlorophenoxy)-2,4-D Acid	100	1,4	U240	B	100 (45.4)
Daunomycin	20830813	5,12-Naphthacenedione, 8-acetyl-10-[3-amino-2,3,6- trideoxy-alpha-L-lyxo-hexo- pyranosyl)oxy]-7,8,9,10- tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-	1*	4	U059	A	10 (4.54)
DDD	72548	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro- TDE 4,4' DDD	1	1,2,4	U060	X	1 (0.454)
4,4' DDD	72548	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro- DDD TDE	1	1,2,4	U060	X	1 (0.454)
DDE	72559	4,4' DDE	1*	2		X	1 (0.454)
4,4' DDE	72559	DDE	1*	2		X	1 (0.454)
DDT	50293	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro- 4,4'-DDT	1	1,2,4	U061	X	1 (0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Code †	RCRA Waste Number	Category	Pounds (Kg)
4,4'-DDT	50293	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro- DDT	1	1,2,4	U061	X	1 (0.454)
DDT AND METABOLITES	N.A.		1*	2			**
Diallate	2303164	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	1*	4	U062	B	100 (45.4)
Diazinon	333415		1	1		X	1 (0.454)
Dibenz[a,h]anthracene	53703	Dibenzo[a,h]anthracene 1,2:5,6-Dibenzanthracene	1*	2,4	U063	X	1 (0.454)
1,2:5,6-Dibenzanthracene	53703	Dibenz[a,h]anthracene Dibenzo[a,h]anthracene	1*	2,4	U063	X	1 (0.454)
Dibenzo[a,h]anthracene	53703	Dibenz[a,h]anthracene 1,2:5,6-Dibenzanthracene	1*	2,4	U063	X	1 (0.454)
Dibenz[a,i]pyrene	189559	Benzo[rst]pentaphene	1*	4	U064	A	10 (4.54)
1,2-Dibromo-3-chloropropane	96128	Propane, 1,2-dibromo-3-chloro-	1*	4	U066	X	1 (0.454)
Dibutyl phthalate	84742	Di-n-butyl phthalate n-Butyl phthalate 1,2-Benzenedicarboxylic acid, dibutyl ester	100	1,2,4	U069	A	10 (4.54)
Di-n-butyl phthalate	84742	Dibutyl phthalate n-Butyl phthalate 1,2-Benzenedicarboxylic acid, dibutyl ester	100	1,2,4	U069	A	10 (4.54)
Dicamba	1918009		1000	1		C	1000 (454)
Dichlobenil	1194656		1000	1		B	100 (45.4)
Dichlone	117806		1	1		X	1 (0.454)
Dichlorobenzene	25321226		100	1		B	100 (45.4)
1,2-Dichlorobenzene	95501	Benzene, 1,2-dichloro- o-Dichlorobenzene	100	1,2,4	U070	B	100 (45.4)
1,3-Dichlorobenzene	541731	Benzene, 1,3-dichloro m-Dichlorobenzene	1*	2,4	U071	B	100 (45.4)
1,4-Dichlorobenzene	106467	Benzene, 1,4-dichloro p-Dichlorobenzene	100	1,2,4	U072	B	100 (45.4)
m-Dichlorobenzene	541731	Benzene, 1,3-dichloro 1,3-Dichlorobenzene	1*	2,4	U071	B	100 (45.4)
o-Dichlorobenzene	95501	Benzene, 1,2-dichloro 1,2-Dichlorobenzene	100	1,2,4	U070	B	100 (45.4)
p-Dichlorobenzene	106467	Benzene,1,4-dichloro 1,4-Dichlorobenzene	100	1,2,4	U072	B	100 (45.4)
DICHLOROBENZIDINE	N.A.		1*	2			**
3,3'-Dichlorobenzidine	91941	[1,1'-Biphenyl]-4,4'diamine,3,3'dichloro-	1*	2,4	U073	X	1 (0.454)
Dichlorobromomethane	75274		1*	2		D	5000 (2270)
1,4-Dichloro-2-butene	764410	2-Butene, 1,4-dichloro-	1*	4	U074	X	1 (0.454)
Dichlorodifluoromethane	75718	Methane, dichlorodifluoro-	1*	4	U075	D	5000 (2270)
1,1-Dichloroethane	75343	Ethane, 1,1-dichloro- Ethylidene dichloride	1*	2,4	U076	C	1000 (454)
1,2-Dichloroethane	107062	Ethane, 1,2-dichloro- Ethylene dichloride	5000	1,2,4	U077	B	100 (45.4)
1,1-Dichloroethylene	75354	Ethene, 1,1-dichloro- Vinylidene chloride	5000	1,2,4	U078	B	100 (45.4)
1,2-Dichloroethylene	156605	Ethene, 1,2-dichloro- (E)	1*	2,4	U079	C	1000 (454)
Dichloroethyl ether	111444	Bis (2-chloroethyl) ether Ethane, 1,1'-oxybis[2-chloro-	1*	2,4	U025	A	10 (4.54)
Dichloroisopropyl ether	108601	Propane, 2,2'-oxybis[2-chloro-	1*	2,4	U027	C	1000 (454)
Dichloromethoxy ethane	111911	Bis(2-chloroethoxy) methane Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-	1*	2,4	U024	C	1000 (454)
Dichloromethyl ether	542881	Methane, oxybis(chloro-	1*	4	P016	A	10 (4.54)
2,4-Dichlorophenol	120832	Phenol, 2,4-dichloro-	1*	2,4	U081	B	100 (45.4)
2,6-Dichlorophenol	87650	Phenol, 2,6-dichloro-	1*	4	U082	B	100 (45.4)
Dichlorophenylarsine	696286	Arsonous dichloride, phenyl-	1*	4	P036	X	1 (0.454)
Dichloropropane	26638197		5000	1		C	1000 (454)
1,1-Dichloropropane	78999						
1,3-Dichloropropane	142289						
1,2-Dichloropropane	78875	Propane, 1,2-dichloro- Propylene dichloride	5000	1,2,4	U083	C	1000 (454)
Dichloropropane—Dichloropropene (mixture)	8003198		5000	1		B	100 (45.4)
Dichloropropene	26952238		5000	1		B	100 (45.4)
2,3-Dichloropropene	78886						
1,3-Dichloropropene	542756	1-Propene, 1,3-dichloro-	5000	1,2,4	U084	B	100 (45.4)
2,2-Dichloropropionic acid	75990		5000	1		D	5000 (2270)
Dichlorvos	62737		10	1		A	10 (4.54)
Dicofol	115322		5000	1		A	10 (4.54)
Dieldrin	60571	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta, 6aalpha,7beta, 7aalpha)-	1	1,2,4	P037	X	1 (0.454)
1,2:3,4-Diepoxybutane	1464535	2,2'-Bioxirane	1*	4	U085	A	10 (4.54)
Diethylamine	109897		1000	1		B	100 (454.4)
Diethylarsine	692422	Arsine, diethyl-	1*	4	P038	X	1 (0.454)
1,4-Diethyleneoxide	123911	1,4-Dioxane	1*	4	U108	B	100 (45.4)
Diethylhexyl phthalate	117817	Bis (2-ethylhexyl)phthalate 1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)] ester	1*	2,4	U028	B	100 (45.4)
N,N'-Diethylhydrazine	1615801	Hydrazine, 1,2-diethyl-	1*	4	U086	A	10 (4.54)
O,O-Diethyl S-methyl dithiophosphate	3288582	Phosphorodithioic acid, O,O-diethyl S-methyl ester	1*	4	U087	D	5000 (2270)
Diethyl-p-nitrophenyl phosphate	311455	Phosphonic acid, diethyl 4-nitrophenyl ester	1*	4	P041	B	100 (45.4)
Diethyl phthalate	84662	1,2-Benzenedicarboxylic acid, diethyl ester	1*	2,4	U088	C	1000 (454)
O,O-Diethyl O-pyrazinyl phosphorothioate	297972	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	1*	4	P040	B	100 (45.4)
Diethylstilbestrol	56531	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)	1*	4	U089	X	1 (0.454)
Dihydrosafrole	94586	1,3-Benzodioxole, 5-propyl-	1*	4	U090	A	10 (4.54)
Diisopropylfluorophosphate	55914	Phosphorofluoridic acid, bis(1-methylethyl) ester	1*	4	P043	B	100 (45.4)
1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha, 8abeta)- 1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro, (1alpha,4alpha,4abeta,5abeta,8beta,	309002	Aldrin	1	1,2,4	P004	X	1 (0.454)
	465736	Isodrin	1*	4	P060	X	1 (0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
8abeta)-2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta,	60571	Dieldrin	1	1,2,4	P037	X	1 (0.454)
6aalpha,7beta,7aalpha)-2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octa-hydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,	72208	Endrin Endrin, & metabolites	1	1,2,4	P051	X	1 (0.454)
6abeta,7beta,7aalpha)-Dimethoate	60515	Phosphorodithioic acid, O,O-dimethyl S-[2(methylamino)-2-oxoethyl] ester	1*	4	P044	A	10 (4.54)
3,3'-Dimethoxybenzidine	119904	[1,1'-Biphenyl]-4,4'diamine,3,3'dimethoxy-	1*	4	U091	B	100 (45.4)
Dimethylamine	124403	Methanamine, N-methyl-	1000	1,4	U092	C	1000 (454)
p-Dimethylaminoazobenzene	60117	Benzenamine, N,N-dimethyl-4-(phenylazo-)	1*	4	U093	A	10 (4.54)
7,12-Dimethylbenz[a]anthracene	57976	Benz[a]anthracene, 7,12-dimethyl-	1*	4	U094	X	1 (0.454)
3,3'-Dimethylbenzidine	119937	[1,1'Biphenyl]-4,4'-diamine,3,3'-dimethyl-	1*	4	U095	A	10 (4.54)
alpha,alpha-Dimethylbenzylhydroperoxide	80159	Hydroperoxide, 1-methyl-1-phenylethyl-	1*	4	U096	A	10 (4.54)
Dimethylcarbamoyl chloride	79447	Carbamic chloride, dimethyl-	1*	4	U097	X	1 (0.454)
1,1-Dimethylhydrazine	57147	Hydrazine, 1,1-dimethyl-	1*	4	U098	A	10 (4.54)
1,2-Dimethylhydrazine	540738	Hydrazine, 1,2-dimethyl-	1*	4	U099	X	1 (0.454)
alpha,alpha-Dimethylphenethylamine	122098	Benzeneethanamine, alpha,alpha-dimethyl-	1*	4	P046	D	5000 (2270)
2,4-Dimethylphenol	105679	Phenol, 2,4-dimethyl-	1*	2,4	U101	B	100 (45.4)
Dimethyl phthalate	131113	1,2-Benzenedicarboxylic acid, dimethyl ester	1*	2,4	U102	D	5000 (2270)
Dimethyl sulfate	77781	Sulfuric acid, dimethyl ester	1*	4	U103	B	100 (45.4)
Dinitrobenzene (mixed)	25154545		1000	1		B	100 (45.4)
m-Dinitrobenzene	99650						
o-Dinitrobenzene	528290						
p-Dinitrobenzene	100254						
4,6-Dinitro-o-cresol and salts	534521	Phenol, 2-methyl-4,6-dinitro-	1*	2,4	P047	A	10 (4.54)
Dinitrophenol	25550587		1000	1		A	10 (4.54)
2,5-Dinitrophenol	329715						
2,6-Dinitrophenol	573568						
2,4-Dinitrophenol	51285	Phenol, 2,4-dinitro-	1000	1,2,4	P048	A	10 (4.54)
Dinitrotoluene	25321146		1000	1,2		A	10 (4.54)
3,4-Dinitrotoluene	610399						
2,4-Dinitrotoluene	121142	Benzene, 1-methyl-2,4-dinitro-	1000	1,2,4	U105	A	10 (4.54)
2,6-Dinitrotoluene	606202	Benzene, 2-methyl-1,3-dinitro-	1000	1,2,4	U106	B	100 (45.4)
Dinoseb	88857	Phenol, 2-(1-methylpropyl)-4,6-dinitro	1*	4	P020	C	1000 (454)
Di-n-octyl phthalate	117840	1,2-Benzenedicarboxylic acid, dioctyl ester	1*	2,4	U107	D	5000 (2270)
1,4-Dioxane	123911	1,4-Diethylenedioxide	1*	4	U108	B	100 (45.4)
DIPHENYLHYDRAZINE	N.A.		1*	2			**
1,2-Diphenylhydrazine	122667	Hydrazine, 1,2-diphenyl-	1*	2,4	U109	A	10 (4.54)
Diphosphoramide, octamethyl-	152169	Octamethylpyrophosphoramide	1*	4	P085	B	100 (45.4)
Diphosphonic acid, tetraethyl ester	107493	Tetraethyl pyrophosphate	100	1,4	P111	A	10 (4.54)
Dipropylamine	142847	1-Propanamine, N-propyl-	1*	4	U110	D	5000 (2270)
Di-n-propylnitrosamine	621647	1-Propanamine, N-nitroso-N-propyl-	1*	2,4	U111	A	10 (4.54)
Diquat	85007 2764729		1000	1		C	1000 (454)
Disulfoton	298044	Phosphorodithioic acid, o,o-diethyl S-[2-(ethylthio)ethyl]ester	1	1,4	P039	X	1 (0.454)
Dithiobiuret	541537	Thioimidodicarbonic diamide [(H2N) C(S)]2NH	1*	4	P049	B	100 (45.4)
Diuron	330541		100	1		B	100 (45.4)
Dodecylbenzenesulfonic acid	27176870		1000	1		C	1000 (454)
Endosulfan	115297	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a- hexahydro-, 3-oxide	1	1,2,4	P050	X	1 (0.454)
alpha - Endosulfan	959988		1*	2		X	1 (0.454)
beta - Endosulfan	33213659		1*	2		X	1 (0.454)
ENDOSALFAN AND METABOLITES	N.A.		1*	2			**
Endosulfan sulfate	1031078		1*	2		X	1 (0.454)
Endothall	145733	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid	1*	4	P088	C	1000 (454)
Endrin	72208	Endrin, & metabolites 2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9 -hexachloro-1a,2,2a,3, 6,6a,7,7a-octa-hydro-, (1aalpha, 2beta,2abeta,3alpha,6alpha, 6abeta,7beta, 7aalpha)-	1	1,2,4	P051	X	1 (0.454)
Endrin aldehyde	7421934		1*	2		X	1 (0.454)
ENDRIN AND METABOLITES	N.A.		1*	2			**
Endrin, & metabolites	72208	Endrin 2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3, 6,6a,7,7a-octa-hydro-, (1aalpha, 2beta,2abeta,3alpha,6alpha, 6abeta,7beta, 7aalpha)-	1	1,2,4	P051	X	1 (0.454)
Epichlorohydrin	106898	Oxirane, (chloromethyl)-	1000	1,4	U041	B	100 (45.4)
Epinephrine	51434	1,2-Benzenediol,4-[1-hydroxy-2-(methylamino)ethyl]-	1*	4	P042	C	1000 (454)
Ethanal	75070	Acetaldehyde	1000	1,4	U001	C	1000 (454)
Ethanamine, N-ethyl-N-nitroso-	55185	N-Nitrosodiethylamine	1*	4	U174	X	1 (0.454)
1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	91805	Methapyrilene	1*	4	U155	D	5000 (2270)
Ethane, 1,2-dibromo-	106934	Ethylene dibromide	1000	1,4	U067	X	1 (0.454)
Ethane, 1,1-dichloro-	75343	Ethylidene dichloride 1,1-Dichloroethane	1*	2,4	U076	C	1000 (454)
Ethane, 1,2-dichloro-	107062	Ethylene dichloride 1,2-Dichloroethane	5000	1,2,4	U077	B	100 (45.4)
Ethanedinitrile	460195	Cyanogen	1*	4	P031	B	100 (45.4)
Ethane, hexachloro-	67721	Hexachloroethane	1*	2,4	U131	B	100 (45.4)
Ethane, 1,1'-[methylenebis(oxy)]bis(2-chloro-	111911	Bis(2-chloroethoxy) methane Dichloromethoxy ethane	1*	2,4	U024	C	1000 (454)
Ethane, 1,1'-oxybis-	60297	Ethyl ether	1*	4	U117	B	100 (45.4)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
Ethane, 1,1'-oxybis[2-chloro-	111444	Bis (2-chloroethyl) ether Dichloroethyl ether	1*	2,4	U025	A	10 (4.54)
Ethane, pentachloro-	76017	Pentachloroethane	1*	4	U184	A	10 (4.54)
Ethane, 1,1,1,2-tetrachloro-	630206	1,1,1,2-Tetrachloroethane	1*	4	U208	B	100 (45.4)
Ethane, 1,1,2,2-tetrachloro-	79345	1,1,2,2-Tetrachloroethane	1*	2,4	U209	B	100 (45.4)
Ethanethioamide	62555	Thioacetamide	1*	4	U218	A	10 (4.54)
Ethane, 1,1,1-trichloro-	71556	Methyl chloroform 1,1,1-Trichloroethane	1*	2,4	U226	C	1000 (454)
Ethane, 1,1,2-trichloro-	79005	1,1,2-Trichloroethane	1*	2,4	U227	B	100 (45.4)
Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester	16752775	Methomyl	1*	4	P066	B	100 (45.4)
Ethanol, 2-ethoxy-	110805	Ethylene glycol monoethyl ether	1*	4	U359	C	1000 (454)
Ethanol, 2,2'-(nitrosoimino)bis-	1116547	N-Nitrosodiethanolamine	1*	4	U173	X	1 (0.454)
Ethanone, 1-phenyl-	98862	Acetophenone	1*	4	U004	D	5000 (2270)
Ethene, chloro-	75014	Vinyl chloride	1*	2,3,4	U043	X	1 (0.454)
Ethene, 2-chloroethoxy-	110758	2-Chloroethyl vinyl ether	1*	2,4	U042	C	1000 (454)
Ethene, 1,1-dichloro-	75354	Vinylidene chloride 1,1-Dichloroethylene	5000	1,2,4	U078	B	100 (45.4)
Ethene, 1,2-dichloro- (E)	156605	1,2-Dichloroethylene	1*	2,4	U079	C	1000 (454)
Ethene, tetrachloro-	127184	Perchloroethylene Tetrachloroethene Tetrachloroethylene	1*	2,4	U210	B	100 (45.4)
Ethene, trichloro-	79016	Trichloroethene Trichloroethylene	1000	1,2,4	U228	B	100 (45.4)
Ethion	563122		10	1		A	10 (4.54)
Ethyl acetate	141786	Acetic acid, ethyl ester	1*	4	U112	D	5000 (2270)
Ethyl acrylate	140885	2-Propenoic acid, ethyl ester	1*	4	U113	C	1000 (454)
Ethylbenzene	100414		1000	1,2		C	1000 (454)
Ethyl carbamate (urethane)	51796	Carbamic acid, ethyl ester	1*	4	U238	B	100 (45.4)
Ethyl cyanide	107120	Propanenitrile	1*	4	P101	A	10 (4.54)
Ethylenebisdithiocarbamic acid, salts & esters	111546	Carbamodithoic acid, 1,2-ethanediylbis, salts & esters	1*	4	U114	D	5000 (2270)
Ethylenediamine	107153		1000	1		D	5000 (2270)
Ethylenediamine-tetraacetic acid (EDTA)	60004		5000	1		D	5000 (2270)
Ethylene dibromide	106934	Ethane, 1,2-dibromo-	1000	1,4	U067	X	1 (0.454)
Ethylene dichloride	107062	Ethane, 1,2-dichloro- 1,2-Dichloroethane	5000	1,2,4	U077	B	100 (45.4)
Ethylene glycol monoethyl ether	110805	Ethanol, 2-ethoxy-	1*	4	U359	C	1000 (454)
Ethylene oxide	75218	Oxirane	1*	4	U115	A	10 (4.54)
Ethylenethiourea	96457	2-Imidazolidinethione	1*	4	U116	A	10 (4.54)
Ethylenimine	151564	Aziridine	1*	4	P054	X	1 (0.454)
Ethyl ether	60297	Ethane, 1,1'-oxybis-	1*	4	U117	B	100 (45.4)
Ethylidene dichloride	75343	Ethane, 1,1-dichloro- 1,1-Dichloroethane	1*	2,4	U076	C	1000 (454)
Ethyl methacrylate	97632	2-Propenoic acid, 2-methyl-, ethyl ester	1*	4	U118	C	1000 (454)
Ethyl methanesulfonate	62500	Methanesulfonic acid, ethyl ester	1*	4	U119	X	1 (0.454)
Famphur	52857	Phosphorothioic acid, O,[4-[(di- methylamino) sulfonyl] phenyl] O,O-dimethyl ester	1*	4	P097	C	1000 (454)
Ferric ammonium citrate	1185575		1000	1		C	1000 (454)
Ferric ammonium oxalate	2944674		1000	1		C	1000 (454)
	55488874						
Ferric chloride	7705080		1000	1		C	1000 (454)
Ferric fluoride	7783508		100	1		B	100 (45.4)
Ferric nitrate	10421484		1000	1		C	1000 (454)
Ferric sulfate	10028225		1000	1		C	1000 (454)
Ferrous ammonium sulfate	10045893		1000	1		C	1000 (454)
Ferrous chloride	7758943		100	1		B	100 (45.4)
Ferrous sulfate	7720787		1000	1		C	1000 (454)
	7782630						
Fluoranthene	206440	Benzo[j,k]fluorene	**	2,4	U120	B	100 (45.4)
Fluorene	86737		1*	2		D	5000 (2270)
Fluorine	7782414		1*	4	P056	A	10 (4.54)
Fluoroacetamide	640197	Acetamide, 2-fluoro-	1*	4	P057	B	100 (45.4)
Fluoroacetic acid, sodium salt	62748	Acetic acid, fluoro-, sodium salt	1*	4	P058	A	10 (4.54)
Formaldehyde	50000		1000	1,4	U122	B	100 (45.4)
Formic acid	64186		5000	1,4	U123	D	5000 (2270)
Fulminic acid, mercury(2+)salt	628864	Mercury fulminate	1*	4	P065	A	10 (4.54)
Fumaric acid	110178		5000	1		D	5000 (2270)
Furan	110009	Furfuran	1*	4	U124	B	100 (45.4)
Furan, tetrahydro-	109999	Tetrahydrofuran	1*	4	U213	C	1000 (454)
2-Furancarboxaldehyde	98011	Furfural	1000	1,4	U125	D	5000 (2270)
2,5-Furandione	108316	Maleic anhydride	5000	1,4	U147	D	5000 (2270)
Furfural	98011	2-Furancarboxaldehyde	1000	1,4	U125	D	5000 (2270)
Furfuran	110009	Furan	1*	4	U124	B	100 (45.4)
Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosourea)-	18883664	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)carbonyl]amino] Streptozotocin	1*	4	U206	X	1 (0.454)
D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)carbonyl]amino]-	18883664	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosourea)- Streptozotocin	1*	4	U206	X	1 (0.454)
Glycidylaldehyde	765344	Oxiranecarboxyaldehyde	1*	4	U126	A	10 (4.54)
Guanidine, N-methyl-N'-nitro-N-nitroso-	70257	MNNG	1*	4	U163	A	10 (4.54)
Guthion	86500		1	1		X	1 (0.454)
HALOETHERS	N.A.		1*	2			**
HALOMETHANES	N.A.		1*	2			**
Heptachlor	76448	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	1	1,2,4	P059	X	1 (0.454)
HEPTACHLOR AND METABOLITES	N.A.		1*	2			**
Heptachlor epoxide	1024573		1*	2		X	1 (0.454)
Hexachlorobenzene	118741	Benzene, hexachloro-	1*	2,4	U127	A	10 (4.54)
Hexachlorobutadiene	87683	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	1*	2,4	U128	X	1 (0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
HEXACHLOROCYCLOHEXANE (all isomers)	608731		1*	2			**
Hexachlorocyclohexane (gamma isomer)	58899	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha, 6beta)- gamma-BHC Lindane	1	1,2,4	U129	X	1 (0.454)
Hexachlorocyclopentadiene	77474	1,3-Cyclopentadiene,1,2,3,4,5,5-hexachloro-	1	1,2,4	U130	A	10 (4.54)
Hexachloroethane	67721	Ethane, hexachloro-	1*	2,4	U131	B	100 (45.4)
Hexachlorophene	70304	Phenol, 2,2'-methylenebis[3,4,6-trichloro-	1*	4	U132	B	100 (45.4)
Hexachloropropene	1888717	1-Propene, 1,1,2,3,3,3-hexachloro-	1*	4	U243	C	1000 (454)
Hexaethyl tetraphosphate	757584	Tetraphosphonic acid, hexaethyl ester	1*	4	P062	B	100 (45.4)
Hydrazine	302012		1*	4	U133	X	1 (0.454)
Hydrazine, 1,2-diethyl-	1615801	N,N'-Diethylhydrazine	1*	4	U086	A	10 (4.54)
Hydrazine, 1,1-dimethyl-	57147	1,1-Dimethylhydrazine	1*	4	U098	A	10 (4.54)
Hydrazine, 1,2-dimethyl-	540738	1,2-Dimethylhydrazine	1*	4	U099	X	1 (0.454)
Hydrazine, 1,2-diphenyl-	122667	1,2-Diphenylhydrazine	1*	2,4	U109	A	10 (4.54)
Hydrazine, methyl-	60344	Methyl hydrazine	1*	4	P068	A	10 (4.54)
Hydrazinecarbothioamide	79196	Thiosemicarbazide	1*	4	P116	B	100 (45.4)
Hydrochloric acid	7647010	Hydrogen chloride	5000	1		D	5000 (2270)
Hydrocyanic acid	74908	Hydrogen cyanide	10	1,4	P063	A	10 (4.54)
Hydrofluoric acid	7664393	Hydrogen fluoride	5000	1,4	U134	B	100 (45.4)
Hydrogen chloride	7647010	Hydrochloric acid	5000	1		D	5000 (2270)
Hydrogen cyanide	74908	Hydrocyanic acid	10	1,4	P063	A	10 (4.54)
Hydrogen fluoride	7664393	Hydrofluoric acid	5000	1,4	U134	B	100 (45.4)
Hydrogen sulfide	7783064	Hydrogen sulfide H2S	100	1,4	U135	B	100 (45.4)
Hydrogen sulfide H2S	7783064	Hydrogen sulfide	100	1,4	U135	B	100 (45.4)
Hydroperoxide, 1-methyl-1-phenylethyl-	80159	alpha,alpha-Dimethylbenzylhydroperoxide	1*	4	U096	A	10 (4.54)
2-Imidazolidinethione	96457	Ethylenethiourea	1*	4	U116	A	10 (4.54)
Indeno(1,2,3-cd)pyrene	193395	1,10-(1,2-Phenylene)pyrene	1*	2,4	U137	B	100 (45.4)
1,3-Isobenzofurandione	85449	Phthalic anhydride	1*	4	U190	D	5000 (2270)
Isobutyl alcohol	78831	1-Propanol, 2-methyl-	1*	4	U140	D	5000 (2270)
Isodrin	465736	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro, (1alpha,4alpha,4abeta,5beta, 8beta,8abeta)-	1*	4	P060	X	1 (0.454)
Isophorone	78591		1*	2		D	5000 (2270)
Isoprene	78795		1000	1		B	100 (45.4)
Isopropanolamine dodecylbenzenesulfonate	42504461		1000	1		C	1000 (454)
Isosafrole	120581	1,3-Benzodioxole, 5-(1-propenyl)-	1*	4	U141	B	100 (45.4)
3(2H)-Isoxazolone, 5-(aminomethyl)-	2763964	Muscimol 5-(Aminomethyl)-3-isoxazolol	1*	4	P007	C	1000 (454)
Kepone	143500	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-	1	1,4	U142	X	1 (0.454)
Lasiocarpine	303344	2-Butenoic acid, 2-methyl-, 7[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z), 7(2S*,3R*),7aalpha]]-	1*	4	U143	A	10 (4.54)
Lead ††	7439921		1*	2			#
Lead acetate	301042	Acetic acid, lead(2+) salt	5000	1,4	U144		#
LEAD AND COMPOUNDS	N.A.		1*	2			**
Lead arsenate	7784409		5000	1		X	1 (0.454)
	7645252						
	10102484						
Lead, bis(acetato-O)tetrahydroxytri-	1335326	Lead subacetate	1*	4	U146	B	100 (45.4)
Lead chloride	7758954		5000	1		B	100 (45.4)
Lead fluoborate	13814965		5000	1		B	100 (45.4)
Lead fluoride	7783462		1000	1		B	100 (45.4)
Lead iodide	10101630		5000	1		B	100 (45.4)
Lead nitrate	10099748		5000	1		B	100 (45.4)
Lead phosphate	7446277	Phosphonic acid, lead(2+) salt (2:3)	1*	4	U145		#
Lead stearate	7428480		5000	1		D	5000# (2270)
	1072351						
	52652592						
	56189094						
Lead subacetate	1335326	Lead, bis(acetato-O)tetrahydroxytri-	1*	4	U146	B	100 (45.4)
Lead sulfate	15739807		5000	1		B	100 (45.4)
	7446142						
Lead sulfide	1314870		5000	1		D	5000# (2270)
Lead thiocyanate	592870		5000	1		B	100 (45.4)
Lindane	58899	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha,6beta)- gamma-BHC Hexachlorocyclohexane (gamma isomer)	1	1,2,4	U129	X	1 (0.454)
Lithium chromate	14307358		1000	1		A	10 (4.54)
Malathion	121755		10	1		B	100 (45.4)
Maleic acid	110167		5000	1		D	5000 (2270)
Maleic anhydride	108316	2,5-Furandione	5000	1,4	U147	D	5000 (2270)
Maleic hydrazide	123331	3,6-Pyridazinedione, 1,2-dihydro-	1*	4	U148	D	5000 (2270)
Malononitrile	109773	Propanedinitrile	1*	4	U149	C	1000 (454)
Melphalan	148823	L-Phenylalanine, 4-[bis(2-chloroethyl) amino]-	1*	4	U150	X	1 (0.454)
Mercaptodimethur	2032657		100	1		A	10 (4.54)
Mercuric cyanide	592041		1	1		X	1 (0.454)
Mercuric nitrate	10045940		10	1		A	10 (4.54)
Mercuric sulfate	7783359		10	1		A	10 (4.54)
Mercuric thiocyanate	592858		10	1		A	10 (4.54)
Mercurous nitrate	10415755		10	1		A	10 (4.54)
	7782867						
Mercury	7439976		1*	2,3,4	U151	X	1 (0.454)
MERCURY AND COMPOUNDS	N.A.		1*	2			**
Mercury, (acetato-O)phenyl-	62384	Phenylmercury acetate	1*	4	P092	B	100 (45.4)
Mercury fulminate	628864	Fulminic acid, mercury(2+) salt	1*	4	P065	A	10 (4.54)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)	56531	Diethylstilbestrol	1*	4	U089	X	1 (0.454)
Phenol, 2,4-dimethyl-	105679	2,4-Dimethylphenol	1*	2,4	U101	B	100(45.4)
Phenol, 2,4-dinitro-	51285	2,4-Dinitrophenol	1000	1,2,4	P048	A	10 (4.5)
Phenol, methyl-	1319773	Cresol(s) Cresylic acid	1000	1,4	U052	C	1000 (45.
m-Cresol	108394	m-Cresylic acid					
o-Cresol	95487	o-Cresylic acid					
p-Cresol	106445	p-Cresylic acid					
Phenol, 2-methyl-4,6-dinitro-	534521	4,6-Dinitro-o-cresol and salts	1*	2,4	P047	A	10 (4.54)
Phenol, 2,2'-methylenebis[3,4,6-trichloro-	70304	Hexachlorophene	1*	4	U132	B	100 (45.4)
Phenol, 2-(1-methylpropyl)-4,6-dinitro	88857	Dinoseb	1*	4	P020	C	1000 (454)
Phenol, 4-nitro-	100027	p-Nitrophenol 4-Nitrophenol	1000	1,2,4	U170	B	100 (45.4)
Phenol, pentachloro-	87865	Pentachlorophenol	10	1,2,4	U242	A	10 (4.54)
Phenol, 2,3,4,6-tetrachloro-	58902	2,3,4,6-Tetrachlorophenol	1*	4	U212	A	10 (4.54)
Phenol, 2,4,5-trichloro-	95954	2,4,5-Trichlorophenol	10	1,4	U230	A	10 (4.54)
Phenol, 2,4,6-trichloro-	88062	2,4,6-Trichlorophenol	10	1,2,4	U231	A	10 (4.54)
Phenol, 2,4,6-trinitro-, ammonium salt	131748	Ammonium picrate	1*	4	P009	A	10 (4.54)
L-Phenylalanine, 4-[bis(2-chloroethyl) amino]	148823	Melphalan	1*	4	U150	X	1 (0.454)
1,10-(1,2-Phenylene)pyrene	193395	Indeno(1,2,3-cd)pyrene	1*	2,4	U137	B	100 (45.4)
Phenylmercury acetate	62384	Mercury, (acetato-O)phenyl-	1*	4	P092	B	100 (45.4)
Phenylthiourea	103855	Thiourea, phenyl-	1*	4	P093	B	100 (45.4)
Phorate	298022	Phosphorodithioic acid, O,O-diethyl S-(ethylthio) methyl ester	1*	4	P094	A	10 (4.54)
Phosgene	75445	Carbonic dichloride	5000	1,4	P095	A	10 (4.54)
Phosphine	7803512		1*	4	P096	B	100 (45.4)
Phosphonic acid	7664382		5000	1		D	5000 (2270)
Phosphonic acid, diethyl 4-nitrophenyl ester	311455	Diethyl-p-nitrophenyl phosphate	1*	4	P041	B	100 (45.4)
Phosphonic acid, lead(2+) salt (2:3)	7446277	Lead phosphate	1*	4	U145		*
Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl]ester	298044	Disulfoton	1	1,4	P039	X	1 (0.454)
Phosphorodithioic acid, O,O-diethyl S-(ethylthio) methyl ester	298022	Phorate	1*	4	P094	A	10 (4.54)
Phosphorodithioic acid, O,O-diethyl S-methyl ester	3288582	O,O-Diethyl S-methyl dithiophosphate	1*	4	U087	D	5000 (2270)
Phosphorodithioic acid, O,O-dimethyl S-[2(methylamino)-2-oxoethyl] ester	60515	Dimethoate	1*	4	P044	A	10 (4.54)
Phosphorofluoridic acid, bis(1-methylethyl) ester	55914	Diisopropylfluorophosphate	1*	4	P043	B	100 (45.4)
Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	56382	Parathion	1	1,4	P089	A	10 (4.54)
Phosphorothioic acid, O,[4-[(dimethylamino) sulfonyl]phenyl]O,O-dimethyl ester	52857	Famphur	1*	4	P097	C	1000 (454)
Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	298000	Methyl parathion	100	1,4	P071	B	100 (45.4)
Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	297972	O,O-Diethyl O-pyrazinyl phosphorothioate	1*	4	P040	B	100 (45.4)
Phosphorus	7723140		1	1		X	1 (0.454)
Phosphorus oxychloride	10025873		5000	1		C	1000 (454)
Phosphorus pentasulfide	1314803	Phosphorus sulfide Sulfur phosphide	100	1,4	U189	B	100 (45.
Phosphorus sulfide	1314803	Phosphorus pentasulfide Sulfur phosphide	100	1,4	U189	B	100 (45.
Phosphorus trichloride	7719122		5000	1		C	1000 (454)
PHTHALATE ESTERS	N.A.		1*	2			**
Phthalic anhydride	85449	1,3-Isobenzofurandione	1*	4	U190	D	5000 (2270)
2-Picoline	109068	Pyridine, 2-methyl-	1*	4	U191	D	5000 (2270)
Piperidine, 1-nitroso-	100754	N-Nitrosopiperidine	1*	4	U179	A	10 (4.54)
Plumbane, tetraethyl-	78002	Tetraethyl lead	100	1,4	P110	A	10 (4.54)
POLYCHLORINATED BIPHENYLS (PCBs)	1336363		10	1,2		X	1 (0.454)
Aroclor 1016	12674112	POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor 1221	11104282	POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor 1232	11141165	POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor 1242	53469219	POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor 1248	12672296	POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor 1254	11097691	POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor 1260	11096825	POLYCHLORINATED BIPHENYLS (PCBs)					
POLYNUCLEAR AROMATIC HYDROCARBONS	N.A.		1*	2			**
Potassium arsenate	7784410		1000	1		X	1 (0.454)
Potassium arsenite	10124502		1000	1		X	1 (0.454)
Potassium bichromate	7778509		1000	1		A	10 (4.54)
Potassium chromate	7789006		1000	1		A	10 (4.54)
Potassium cyanide	151508	Potassium cyanide K (CN)	10	1,4	P098	A	10 (4.54)
Potassium cyanide K(CN)	151508	Potassium cyanide	10	1,4	P098	A	10 (4.54)
Potassium hydroxide	1310583		1000	1		C	1000 (454)
Potassium permanganate	7722647		100	1		B	100 (45.4)
Potassium silver cyanide	506616	Argentate (1-), bis(cyano-C)-, potassium	1*	4	P099	X	1 (0.454)
Pronamide	23950585	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	1*	4	U192	D	5000 (2270)
Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime	116063	Aldicarb	1*	4	P070	X	1 (0.454)
1-Propanamine	107108	n-Propylamine	1*	4	U194	D	5000 (2270)
1-Propanamine, N-propyl-	142847	Dipropylamine	1*	4	U110	D	5000 (2270)
1-Propanamine, N-nitroso-N-propyl-	621647	Di-n-propylnitrosamine	1*	2,4	U111	A	10 (4.54)
Propane, 1,2-dibromo-3-chloro-	96128	1,2-Dibromo-3-chloropropane	1*	4	U066	X	1 (0.454)
Propane, 2-nitro-	79469	2-Nitropropane	1*	4	U171	A	10 (4.54)
1,3-Propane sultone	1120714	1,2-Oxathiolane, 2,2-dioxide	1*	4	U193	A	10 (4.54)
Propane, 1,2-dichloro-	78875	Propylene dichloride 1,2-Dichloropropane	5000	1,2,4	U083	C	1000 (454)
Propanedinitrile	109773	Malononitrile	1*	4	U149	C	1000 (454)
Propanenitrile	107120	Ethyl cyanide	1*	4	P101	A	10 (4.54)
Propanenitrile, 3-chloro-	542767	3-Chloropropionitrile	1*	4	P027	C	1000 (454)
Propanenitrile, 2-hydroxy-2-methyl-	75865	Acetone cyanohydrin 2-Methyllactonitrile	10	1,4	P069	A	10 (4.54)
Propane, 2,2'-oxybis[2-chloro-	108601	Dichloroisopropyl ether	1*	2,4	U027	C	1000 (454)
1,2,3-Propanetriol, trinitrate-	55630	Nitroglycerine	1*	4	P081	A	10 (4.
1-Propanol, 2,3-dibromo-, phosphate (3:1)	126727	Tris(2,3-dibromopropyl) phosphate	1*	4	U235	A	10 (4.

Hazardous Substance	CASRN	Regulatory Synonyms	RQ	Code †	RCRA Waste Number	Cat
1-Propanol, 2-methyl-	78831	Isobutyl alcohol	1*	4	U140	D
2-Propanone	67641	Acetone	1*	4	U002	D
2-Propanone, 1-bromo-	598312	Bromoacetone	1*	4	P017	C
Propargite	2312358		10	1		A
Propargyl alcohol	107197	2-Propyn-1-ol	1*	4	P102	C
2-Propenal	107028	Acrolein	1	1,2,4	P003	X
2-Propenamide	79061	Acrylamide	1*	4	U007	D
1-Propene, 1,1,2,3,3,3-hexachloro-	1888717	Hexachloropropene	1*	4	U243	C
1-Propene, 1,3-dichloro-	542756	1,3-Dichloropropene	5000	1,2,4	U084	B
2-Propenenitrile	107131	Acrylonitrile	100	1,2,4	U009	B
2-Propenenitrile, 2-methyl-	126987	Methacrylonitrile	1*	4	U152	C
2-Propenoic acid	79107	Acrylic acid	1*	4	U008	D
2-Propenoic acid, ethyl ester	140885	Ethyl acrylate	1*	4	U113	C
2-Propenoic acid, 2-methyl-, ethyl ester	97632	Ethyl methacrylate	1*	4	U118	C
2-Propenoic acid, 2-methyl-, methyl ester	80626	Methyl methacrylate	5000	1,4	U162	C
2-Propen-1-ol	107186	Allyl alcohol	100	1,4	P005	B
Propionic acid	79094		5000	1		D
Propionic acid, 2-(2,4,5-trichlorophenoxy)-	93721	Silvex (2,4,5-TP) 2,4,5-TP acid	100	1,4	U233	B
Propionic anhydride	123626		5000	1		D
n-Propylamine	107108	1-Propanamine	1*	4	U194	D
Propylene dichloride	78875	Propane, 1,2-dichloro- 1,2-Dichloropropane	5000	1,2,4	U083	C
Propylene oxide	75569		5000	1		B
1,2-Propylenimine	75558	Aziridine, 2-methyl-	1*	4	P067	X
2-Propyn-1-ol	107197	Propargyl alcohol	1*	4	P102	C
Pyrene	129000		1*	2		D
Pyrethrins	121299		1000	1		X
	121211					
	8003347					
3,6-Pyridazinedione, 1,2-dihydro-	123331	Maleic hydrazide	1*	4	U148	D
4-Pyridinamine	504245	4-Aminopyridine	1*	4	P008	C
Pyridine	110861		1*	4	U196	C
Pyridine, 2-methyl-	109068	2-Picoline	1*	4	U191	D
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-	54115	Nicotine, & salts	1*	4	P075	B
2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-	66751	Uracil mustard	1*	4	U237	A
4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	56042	Methylthiouracil	1*	4	U164	A
Pyrrolidine, 1-nitroso-	930552	N-Nitrosopyrrolidine	1*	4	U180	X
Quinoline	91225		1000	1		D
RADIONUCLIDES	N.A.		1*	3		
Reserpine	50555	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester (3beta, 16beta,17alpha,18beta,20alpha)-	1*	4	U200	D
Resorcinol	108463	1,3-Benzenediol	1000	1,4	U201	D
Saccharin and salts	81072	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide	1*	4	U202	B
Safrole	94597	1,3-Benzodioxole, 5-(2-propenyl)-	1*	4	U203	B
Selenious acid	7783008		1*	4	U204	A
Selenious acid, dithallium (1+) salt	12039520	Thallium selenite	1*	4	P114	C
Selenium ††	7782492		1*	2		B
SELENIUM AND COMPOUNDS	N.A.		1*	2		
Selenium dioxide	7446084	Selenium oxide	1000	1,4	U204	A
Selenium oxide	7446084	Selenium dioxide	1000	1,4	U204	A
Selenium sulfide	7488564	Selenium sulfide SeS2	1*	4	U205	A
Selenium sulfide SeS2	7488564	Selenium sulfide	1*	4	U205	A
Selenoureas	630104		1*	4	P103	C
L-Serine, diazoacetate (ester)	115026	Azaserine	1*	4	U015	X
Silver ††	7440224		1*	2		C
SILVER AND COMPOUNDS	N.A.		1*	2		
Silver cyanide	506649	Silver cyanide Ag (CN)	1*	4	P104	X
Silver cyanide Ag (CN)	506649	Silver cyanide	1*	4	P104	X
Silver nitrate	7761888		1	1		X
Silvex (2,4,5-TP)	93721	Propionic acid, 2-(2,4,5-trichlorophenoxy)- 2,4,5-TP acid	100	1,4	U233	B
Sodium	7440235		1000	1		A
Sodium arsenate	7631892		1000	1		X
Sodium arsenite	7784465		1000	1		X
Sodium azide	26628228		1*	4	P105	C
Sodium bichromate	10588019		1000	1		A
Sodium bifluoride	1333831		5000	1		B
Sodium bisulfite	7631905		5000	1		D
Sodium chromate	7775113		1000	1		A
Sodium cyanide	143339	Sodium cyanide Na (CN)	10	1,4	P106	A
Sodium cyanide Na (CN)	143339	Sodium cyanide	10	1,4	P106	A
Sodium dodecylbenzenesulfonate	25155300		1000	1		C
Sodium fluoride	7681494		5000	1		C
Sodium hydrosulfide	16721805		5000	1		D
Sodium hydroxide	1310732		1000	1		C
Sodium hypochlorite	7681529		100	1		B
	10022705					
Sodium methylate	124414		1000	1		C
Sodium nitrite	7632000		100	1		B
Sodium phosphate, dibasic	7558794		5000	1		D
	10039324					
	10140655					

Hazardc	Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Categ.
Sodium phosphate, tric	Unlisted Hazardous Wastes Characteristic of Reactivity.	N.A.		1**	4	D003	B
	Uracil mustard	66751	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-	1**	4	U237	
	Uranyl acetate	541093		5000	1		E
	Uranyl nitrate	10102064		5000	1		E
Sodium selenite		36478769					
Streptozotocin	Urea, N-ethyl-N-nitroso-	759739	N-Nitroso-N-ethylurea	1**	4	U176	X
	Urea, N-methyl-N-nitroso-	684935	N-Nitroso-N-methylurea	1**	4	U177	X
	Vanadic acid, ammonium salt	7803556	Ammonium vanadate	1**	4	P119	C
	Vanadium oxide V2O5	1314621	Vanadium pentoxide	1000	1,4	P120	C
	Vanadium pentoxide	1314621	Vanadium oxide V2O5	1000	1,4	P120	C
Strontium chromate	Vanadyl sulfate	27774136		1000	1		C
Strychnidin-10-one	Vinyl chloride	75014	Ethene, chloro-	1**	2,3,4	U043	X
Strychnidin-10-one, 2,3-	Vinyl acetate	108054	Vinyl acetate monomer	1000	1		D
Strychnine, & salts	Vinyl acetate monomer	108054	Vinyl acetate	1000	1		D
Styrene	Vinylamine, N-methyl-N-nitroso-	4549400	N-Nitrosomethylvinylamine	1**	4	P084	A
Sulfur monochloride	Vinylidene chloride	75354	Ethene, 1,1-dichloro-; 1,1-Dichloroethylene	5000	1,2,4	U078	B
Sulfur phosphide	Warfarin, & salts, when present at concentrations greater than 0.3%.	81812	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations greater than 0.3%	1**	4	P001	B
Sulfuric acid	Xylene (mixed)	1330207	Benzene, dimethyl	1000	1,4	U239	C
Sulfuric acid, dithallium	m-Benzene, dimethyl	108383	m-Xylene				
Sulfuric acid, dimethyl e	o-Benzene, dimethyl	95476	o-Xylene				
2,4,5-T acid	p-Benzene, dimethyl	106423	p-Xylene				
	Xylenol	1300716		1000	1		C
2,4,5-T amines	Yohimban-16-carboxylic acid,11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester (3beta,16beta,17alpha, 18beta, 20alpha)-	50555	Reserpine	1**	4	U200	D
2,4,5-T esters	Zinc †††	7440666		1**	2		C
	ZINC AND COMPOUNDS	N.A.		1**	2		
	Zinc acetate	557346		1000	1		C
	Zinc ammonium chloride	52628258		5000	1		C
		14639975					
		14639986					
2,4,5-T salts	Zinc borate	1332076		1000	1		C
2,4,5-T	Zinc bromide	7699458		5000	1		C
	Zinc carbonate	3486359		1000	1		C
TDE	Zinc chloride	7646857		5000	1		C
	Zinc cyanide	557211	Zinc cyanide Zn(CN)2	10	1,4	P121	A
1,2,4,5-Tetrachlorobenz	Zinc cyanide Zn(CN)2	557211	Zinc cyanide	10	1,4	P121	A
2,3,7,8-Tetrachlorodibe	Zinc fluoride	7783495		1000	1		C
1,1,1,2-Tetrachloroetha	Zinc formate	557415		1000	1		
1,1,2,2-Tetrachloroetha	Zinc hydrosulfite	7779864		1000	1		
Tetrachloroethene	Zinc nitrate	7779886		5000	1		
	Zinc phenolsulfonate	127822		5000	1		D
	Zinc phosphide	1314847	Zinc phosphide Zn3P2, when present at concentrations greater than 10%	1000	1,4	P122	B
Tetrachloroethylene	Zinc phosphide Zn3P2, when present at concentrations greater than 10%.	1314847	Zinc phosphide	1000	1,4	P122	B
2,3,4,6-Tetrachloropher	Zinc silicofluoride	16871719		5000	1		D
Tetraethyl lead	Zinc sulfate	7733020		1000	1		C
Tetraethyl pyrophosphi	Zirconium nitrate	13746899		5000	1		D
Tetraethyldithiopyropho	Zirconium potassium fluoride	16923958		5000	1		C
Tetrahydrofuran	Zirconium sulfate	14644612		5000	1		D
Tetranitromethane	Zirconium tetrachloride	10026116		5000	1		D
Tetraphosphonic acid, h	F001			1*	4	F001	A
Thallic oxide	The following spent halogenated solvents used in degreasing; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004 and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.						
Thallium †††	(a) Tetrachloroethylene	127184		1*	2,4	U210	B
Thallium and compoun	(b) Trichloroethylene	79016		1000	1,2,4	U228	B
Thallium (I) acetate	(c) Methylene chloride	75092		1*	2,4	U080	C
Thallium (I) carbonate	(d) 1,1,1-Trichloroethane	71556		1*	2,4	U226	C
Thallium (I) chloride	(e) Carbon tetrachloride	56235		5000	1,2,4	U211	A
Thallium chloride TlCl	(f) Chlorinated fluorocarbons	N.A.					D
Thallium (I) nitrate	F002			1*	4	F002	A
Thallium oxide Tl2O3	The following spent halogenated solvents; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.						
Thallium selenite	(a) Tetrachloroethylene	127184		1*	2,4	U210	B
Thallium (I) sulfate	(b) Methylene chloride	75092		1*	2,4	U080	C
	(c) Trichloroethylene	79016		1000	1,2,4	U228	B
Thioacetamide	(d) 1,1,1-Trichloroethane	71556		1*	2,4	U226	C
Thiodiphosphonic acid,	(e) Chlorobenzene	108907		100	1,2,4	U037	B
Thiofanox	(f) 1,1,2-Trichloro-1,2,2-trifluoroethane	76131					
	(g) o-Dichlorobenzene	95501		100	1,2,4	U070	
Thiomidodicarbonic dia	(h) Trichlorofluoromethane	75694		1*	4	U121	
Thiomethanol							
Thioperoxydicarbonic d trimethyl)-							
Thiophenol							
Thiosemicarbazide							
Thiourea							
Thiourea, (2-chlorophe							
Thiourea, 1-naphthalen							
Thiourea, phenyl-							
Thiram							
Toluene							

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
(i) 1,1,2-Trichloroethane	79005		1*	2,4	U227	B	100 (45.4)
F003			1*	4	F003	B	100 (45.4)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:							
(a) Xylene	1330207					C	1000 (454)
(b) Acetone	67641					D	5000 (2270)
(c) Ethyl acetate	141786					D	5000 (2270)
(d) Ethylbenzene	100414					C	1000 (454)
(e) Ethyl ether	60297					B	100 (45.4)
(f) Methyl isobutyl ketone	108101					D	5000 (2270)
(g) n-Butyl alcohol	71363					D	5000 (2270)
(h) Cyclohexanone	108941					D	5000 (2270)
(i) Methanol	67561					D	5000 (2270)
F004			1*	4	F004	C	1000 (454)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:							
(a) Cresols/Cresylic acid	1319773		1000	1,4	U052	C	1000 (454)
(b) Nitrobenzene	98953		1000	1,2,4	U169	C	1000 (454)
F005			1*	4	F005	B	100 (45.4)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:							
(a) Toluene	108883		1000	1,2,4	U220	C	1000 (454)
(b) Methyl ethyl ketone	78933		1*	4	U159	D	5000 (2270)
(c) Carbon disulfide	75150		5000	1,4	P022	B	100 (45.4)
(d) Isobutanol	78831		1*	4	U140	D	5000 (2270)
(e) Pyridine	110861		1*	4	U196	C	1000 (454)
F006			1*	4	F006	A	10 (4.54)
Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum, (2) tin plating on carbon steel, (3) zinc plating (segregated basis) on carbon steel, (4) aluminum or zinc-aluminum plating on carbon steel, (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel, and (6) chemical etching and milling of aluminum.							
F007			1*	4	F007	A	10 (4.54)
Spent cyanide plating bath solutions from electroplating operations.							
F008			1*	4	F008	A	10 (4.54)
Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.							
F009			1*	4	F009	A	10 (4.54)
Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.							
F010			1*	4	F010	A	10 (4.54)
Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.							
F011			1*	4	F011	A	10 (4.54)
Spent cyanide solution from salt bath pot cleaning from metal heat treating operations.							
F012			1*	4	F012	A	10 (4.54)
Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.							
F019			1	4	F019	A	10 (4.54)
Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process							
F020			1*	4	F020	X	1 (0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri-or-tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.)							
F021			1*	4	F021	X	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.							
F022			1*	4	F022	X	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.							
F023			1*	4	F023	X	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.)							
F024			1*	4	F024	X	1 (0.454)
Wastes, including but not limited to distillation residues, heavy ends, tars, and reactor cleanout wastes, from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent desiccants(sic), wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in Section 261.32.)							
F025			1*	4	F025	X	##1 (0.454)
Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution..							
F026			1*	4	F026	X	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.							
F027			1*	4	F027	X	1 (0.454)
Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-tri-chlorophenol as the sole component.)							
F028			1*	4	F028	X	1 (0.454)
Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027.							
F032			1*	4	F032	X	1(0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations (except wastes from processes that have had the F032 waste code deleted in accordance with § 261.35 and do not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.							
F034			1*	4	F034	X	1(0.454)
Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.							
F035			1*	4	F035	X	1(0.454)
Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.							
F037			1*	4	F037	X	1 (0.454)
Petroleum refinery primary oil/water/solids separation sludge—Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing.							
F038			1*	4	F038	X	1 (0.454)
Petroleum refinery secondary (emulsified) oil/water/solids separation sludge—Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from once-through non-contact cooling waters segregated for treatment from other process or oil cooling wastes, sludges and floats generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.							
K001			1*	4	K001	X	1 (0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Code †	RCRA Waste Number	Category	Pounds (Kg)
Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.							
K002			1*	4	K002		#
Wastewater treatment sludge from the production of chrome yellow and orange pigments.							
K003			1*	4	K003		#
Wastewater treatment sludge from the production of molybdate orange pigments.							
K004			1*	4	K004	A	10 (4.54)
Wastewater treatment sludge from the production of zinc yellow pigments.							
K005			1*	4	K005		#
Wastewater treatment sludge from the production of chrome green pigments.							
K006			1*	4	K006	A	10 (4.54)
Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).							
K007			1*	4	K007	A	10 (4.54)
Wastewater treatment sludge from the production of iron blue pigments.							
K008			1*	4	K008	A	10 (4.54)
Oven residue from the production of chrome oxide green pigments.							
K009			1*	4	K009	A	10 (4.54)
Distillation bottoms from the production of acetaldehyde from ethylene.							
K010			1*	4	K010	A	10 (4.54)
Distillation side cuts from the production of acetaldehyde from ethylene.							
K011			1*	4	K011	A	10 (4.54)
Bottom stream from the wastewater stripper in the production of acrylonitrile.							
K013			1*	4	K013	A	10 (4.54)
Bottom stream from the acetonitrile column in the production of acrylonitrile.							
K014			1*	4	K014	D	5000 (2270)
Bottoms from the acetonitrile purification column in the production of acrylonitrile.							
K015			1*	4	K015	A	10 (4.54)
Still bottoms from the distillation of benzyl chloride.							
K016			1*	4	K016	X	1 (0.454)
Heavy ends or distillation residues from the production of carbon tetrachloride.							
K017			1*	4	K017	A	10 (4.54)
Heavy ends (still bottoms) from the purification column in the production of epi-chlorohydrin.							
K018			1*	4	K018	X	1 (0.454)
Heavy ends from the fractionation column in ethyl chloride production.							
K019			1*	4	K019	X	1 (0.454)
Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.							
K020			1*	4	KC20	X	1 (0.454)
Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.							
K021			1*	4	K021	A	10 (4.54)
Aqueous spent antimony catalyst waste from fluoromethanes production.							
K022			1*	4	K022	X	1 (0.454)
Distillation bottom tars from the production of phenol/acetone from cumene.							
K023			1*	4	K023	D	5000 (2270)
Distillation light ends from the production of phthalic anhydride from naphthalene.							
K024			1*	4	K024	D	5000 (2270)
Distillation bottoms from the production of phthalic anhydride from naphthalene.							
K025			1*	4	K025	A	10 (4.54)
Distillation bottoms from the production of nitrobenzene by the nitration of benzene.							
K026			1*	4	K026	C	1000 (454)
Stripping still tails from the production of methyl ethyl pyridines.							
K027			1*	4	K027	A	10 (4.54)
Centrifuge and distillation residues from toluene diisocyanate production.							
K028			1*	4	K028	X	1 (0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.							
K029			1*	4	K029	X	1 (0.454)
Waste from the product steam stripper in the production of 1,1,1-trichloroethane.							
K030			1*	4	K030	X	1 (0.454)
Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.							
K031			1*	4	K031	X	1 (0.454)
By-product salts generated in the production of MSMA and cacodylic acid.							
K032			1*	4	K032	A	10 (4.54)
Wastewater treatment sludge from the production of chlordane.							
K033			1*	4	K033	A	10 (4.54)
Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.							
K034			1*	4	K034	A	10 (4.54)
Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.							
K035			1*	4	K035	X	1 (0.454)
Wastewater treatment sludges generated in the production of creosote.							
K036			1*	4	K036	X	1 (0.454)
Still bottoms from toluene reclamation distillation in the production of disulfoton.							
K037			1*	4	K037	X	1 (0.454)
Wastewater treatment sludges from the production of disulfoton.							
K038			1*	4	K038	A	10 (4.54)
Wastewater from the washing and stripping of phorate production.							
K039			1*	4	K039	A	10 (4.54)
Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.							
K040			1*	4	K040	A	10 (4.54)
Wastewater treatment sludge from the production of phorate.							
K041			1*	4	K041	X	1 (0.454)
Wastewater treatment sludge from the production of toxaphene.							
K042			1*	4	K042	A	10 (4.54)
Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.							
K043			1*	4	K043	A	10 (4.54)
2,6-Dichlorophenol waste from the production of 2,4-D.							
K044			1*	4	K044	A	10 (4.54)
Wastewater treatment sludges from the manufacturing and processing of explosives.							
K045			1*	4	K045	A	10 (4.54)
Spent carbon from the treatment of wastewater containing explosives.							
K046			1*	4	K046	B	100 (45.4)
Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.							
K047			1*	4	K047	A	10 (4.54)
Pink/red water from TNT operations.							
K048			1*	4	K048		#
Dissolved air flotation (DAF) float from the petroleum refining industry.							
K049			1*	4	K049		#
Slop oil emulsion solids from the petroleum refining industry.							
K050			1*	4	K050	A	10 (4.54)
Heat exchanger bundle cleaning sludge from the petroleum refining industry.							
K051			1*	4	K051		#

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Code †	RCRA Waste Number	Category	Pounds (Kg)
API separator sludge from the petroleum refining industry.							
K052			1*	4	K052	A	10 (4.54)
Tank bottoms (leaded) from the petroleum refining industry.							
K060			1*	4	K060	X	1 (0.454)
Ammonia still lime sludge from coking operations.							
K061			1*	4	K061		#
Emission control dust/sludge from the primary production of steel in electric furnaces.							
K062			1*	4	K062		#
Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332).							
K064			1*	4	K064		##
Acid plant blowdown slurry/sludge resulting from thickening of blowdown slurry from primary copper production.							
K065			1*	4	K065		##
Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities.							
K066			1*	4	K066		##
Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production.							
K069			1*	4	K069		#
Emission control dust/sludge from secondary lead smelting.							
K071			1*	4	K071	X	1 (0.454)
Brine purification muds from the mercury cell process in chlorine production, where separately purified brine is not used.							
K073			1*	4	K073	A	10 (4.54)
Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production.							
K083			1*	4	K083	B	100 (45.4)
Distillation bottoms from aniline extraction.							
K084			1*	4	K084	X	1 (0.454)
Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.							
K085			1*	4	K085	A	10 (4.54)
Distillation or fractionation column bottoms from the production of chlorobenzenes.							
K086			1*	4	K086		#
Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.							
K087			1*	4	K087	B	100 (45.4)
Decanter tank tar sludge from coking operations.							
K088			1*	4	K088		
Spent potliners from primary aluminum reduction.							
K090			1*	4	K090		
Emission control dust or sludge from ferrochromium-silicon production.							
K091			1	4	K091		
Emission control dust or sludge from ferrochromium production.							
K093			1*	4	K093	D	5000 (2270)
Distillation light ends from the production of phthalic anhydride from ortho-xylene.							
K094			1*	4	K094	D	5000 (2270)
Distillation bottoms from the production of phthalic anhydride from ortho-xylene.							
K095			1*	4	K095	B	100 (45.4)
Distillation bottoms from the production of 1,1,1-trichloroethane.							
K096			1*	4	K096	B	100 (45.4)
Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.							
K097			1*	4	K097	X	1 (0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	RQ	Code †	RCRA Waste Number	Category	Pounds (Kg)
Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.							
K098			1*	4	K098	X	1 (0.454)
Untreated process wastewater from the production of toxaphene.							
K099			1*	4	K099	A	10 (4.54)
Untreated wastewater from the production of 2,4-D							
K100			1*	4	K100		*
Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.							
K101			1*	4	K101	X	1 (0.454)
Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.							
K102			1*	4	K102	X	1 (0.454)
Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.							
K103			1*	4	K103	B	100 (45.4)
Process residues from aniline extraction from the production of aniline.							
K104			1*	4	K104	A	10 (4.54)
Combined wastewater streams generated from nitrobenzene/aniline production.							
K105			1*	4	K105	A	10 (4.54)
Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.							
K106			1*	4	K106	X	1 (0.454)
Wastewater treatment sludge from the mercury cell process in chlorine production.							
K107			10	4	K107	X	10 (4.54)
Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazines.							
K108			10	4	K108	X	10 (4.54)
Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.							
K109			10	4	K109	X	10 (4.54)
Spent filter cartridges from product purification from the production of 1,1- dimethylhydrazine (UDMH) from carboxylic acid hydrazides.							
K110			10	4	K110	X	10 (4.54)
Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.							
K111			1*	4	K111	A	10 (4.54)
Product washwaters from the production of dinitrotoluene via nitration of toluene.							
K112			1*	4	K112	A	10 (4.54)
Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.							
K113			1*	4	K113	A	10 (4.54)
Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.							
K114			1*	4	K114	A	10 (4.54)
Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.							
K115			1*	4	K115	A	10 (4.54)
Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.							
K116			1*	4	K116	A	10 (4.54)
Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.							
K117			1*	4	K117	X	1 (0.454)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code †	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds (Kg)
Wastewater from the reaction vent gas scrubber in the production of ethylene bromide via bromination of ethene.							
K118			1*	4	K118	X	1 (0.454)
Spent absorbent solids from purification of ethylene dibromide in the production of ethylene dibromide.							
K123			1*	4	K123	A	10 (4.54)
Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.							
K124			1*	4	K124	A	10 (4.54)
Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.							
K125			1*	4	K125	A	10 (4.54)
Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.							
K126			1*	4	K126	A	10 (4.54)
Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts.							
K131			100	4	K131	X	100 (45.4)
Wastewater from the reactor and spent sulfuric acid from the acid dryer in the production of methyl bromide.							
K132			1000	4	K132	X	1000 (454)
Spent absorbent and wastewater solids from the production of methyl bromide.							
K136			**	4	K136	X	1 (0.454)
Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.							

* Indicates the statutory source as defined by 1, 2, 3, and 4 below.
†† No reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 micrometers (0.004 inches).
††† The RQ for asbestos is limited to friable forms only.
1—Indicates that the statutory source for designation of this hazardous substance under CERCLA is CWA Section 311(b)(4).
2—Indicates that the statutory source for designation of this hazardous substance under CERCLA is CWA Section 307(a).
3—Indicates that the statutory source for designation of this hazardous substance under CERCLA is CAA Section 112.
4—Indicates that the statutory source for designation of this hazardous substance under CERCLA is RCRA Section 3001.
1*—Indicates that the 1-pound RQ is a CERCLA statutory RQ.
# Indicates that the RQ is subject to change when the assessment of potential carcinogenicity is completed.
The Agency may adjust the statutory RQ for this hazardous substance in a future rulemaking; until then the statutory RQ applies.
§—The adjusted RQs for radionuclides may be found in Appendix B to this table.
**—Indicates that no RQ is being assigned to the generic or broad class.

ANNEX VII

DISTRIBUTION LIST

27TH FIGHTER WING (ACC)
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NEW MEXICO 88103-5000
25 FEBRUARY 1993

DISTRIBUTION LIST

Office	Office Symbol	No Copies
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Operations Support Squadron	OSS/OSTR	1
Security Police Emergency Desk	SPS/SPOL	2
Associate Units		2
Melrose AFR Contractor (Westar, Inc.)		20

TO VIEW THE MAP AND/OR MAPS WITH THIS DOCUMENT, PLEASE CALL THE HAZARDOUS WASTE BUREAU AT 505-476-6000 TO MAKE AN APPOINTMENT

JR

[redacted]

United States Air Force

RCRA Subpart X Part B Application

100-Year Flood Plain Study

Open Burn/Open Detonation Thermal Treatment Facility

Melrose Air Force Range New Mexico

February 1993

UNNAMED ARROYO NEAR FLOYD, NM

RIO GRANDE BASIN

Part 8 UNGAGED SITE

100-YEAR FLOOD PLAIN STUDY

TYPE OF MEASUREMENT. --Flood hydrograph and water surface profile determination for a ungaged site. The techniques for this flood plain analysis are accomplished using the SCS unit hydrograph approach in computer program package of HEC-1. Water surface profile computations are accomplished using computer program WSPRO.

LOCATION. --Lat. 34 16 43, long. 103 47 23, in SE NW SW, sec. 27, T.1 N., R. 30 E., 14.5 miles southwest of Melrose and 13 miles west-northwest of Floyd, in Roosevelt county. Study reach starts about 300 feet above Open burn/Open Detonation unit situated on the Melrose Bombing Range and ends about 350 feet below the unit. Site altitude is 4,380 feet from topographic map.

SURVEY OF SITE. --The drainage basin was determined for the unit location and a corresponding stream reach traversing the unit, for the 100 year flood boundary determination. The channel geometry was surveyed on January 25-26, 1993 by Ben Phillips and Scott Waltemeyer. Instrument W453551 was found correct by double rodding between two hubs and closed on the RP 1 at -0.05 ft. closure. The instrument for the surveying is a Total Station and the radial traversing function is used for the cross-section stationing.

DRAINAGE AREA. --7.3 square miles. U.S. Geological Survey 7.5 minute quadrangle maps: Tolar, SE and Gammil Well, NE was used for the drainage basin delineation. The basin was divided into a overland flow subbasin on top of the mesa and gullied subbasin below the escarpment. The following basin measurements are:

Subbasin	Drainage area (square miles)	Flow length (feet)	Altitude-high (feet)	Altitude-low (feet)	H
Overland	3.71	7,550	4,690	4,640	50
Gullied	3.57	19,960	4,600	4,400	200

FIELD CONDITIONS. --A reach was surveyed for 5,430 ft. The reach is straight with some contraction on the most downstream section. The channel is defined in the vicinity of the OB/OD unit, but the topography is disturbed below. Roads and a motor pool parking area exist below. Cross sections 5, 6, 7, and 8 are not used for the analysis because a flow channel is not defined. Channel material consists of grass, firm earth and some sand in the channel bottom. Roughness coefficients using Mannings n values:

Section	n value Sub area 1 and 2
1	0.022 0.024
2	0.022 0.024
3	0.022 0.024
4	0.022 0.024
5	propagated from section 4
6	"
7	"
8	"

Two photographs were made from 35mm color slides.

HYDROLOGY. --The 100 year peak discharge is determined from unit hydrograph method of the U.S. Soil Conservation Service, known as SCS TR-20 computer program. The U.S. Army Corps of Engineers computer package known as Hydrologic Engineering Center HEC-1 also includes the SCS TR-20 method. The HEC-1 Flood Hydrograph Package is used for this analysis beginning on page 4.

Precipitation Component: A synthetic storm from depth-duration data is used for the hypothetical 100 year 24 hour storm. NOAA precipitation station CN 1838 Clovis-North. The 24 hour precipitation for the basin is 5.40 inches and a NOAA Atlas II rainfall distribution is used for the analysis. The NOAA Atlas II for New Mexico was used for the 5-minute, 15-minute, 60-minute, 2-hour, 3-hour, 6-hour, 12-hour, and 24-hour rainfall distribution. The precipitation depth values are listed on the HEC-1 computer input and output. The following model parameters determined are as follows:

Subbasin	SCS lag hours		Subbasin slope percent	v fps	CN	Impervious area percent
Overland	1.57	2.62	0.7	0.8	74	10.4
Gullied	0.90	1.50	1.0	--	74	4.5

The overland flow Tc is computed with the following equation:

$$Tc = L/3600 * V$$

where L is flow length in feet;
V is velocity in feet per second, from figure 2.3 of SCS chapter 2 manual for New Mexico. The overland flow hydrograph is shown on page 11.

$$SCS\ lag = Tc * 0.6$$

The gullied flow Tc is computed from figure 2.2 using Kirpicks relation with flow length and altitude fall. SCS lag as above. A hydrograph of the gullied or channel flow is shown on page 16. A 100-year peak discharge of 5,550 cubic feet per second is determined for this site from the above method. A hydrograph of the combined overland and gullied flow is shown on page 17.

HYDRAULICS. --Water surface profiles are obtained by computer program WSPRO developed by the Federal Highway Administration/ U.S. Geological Survey beginning on page 19. The method referred to as the standard step method for balancing the Energy Equation also known as step-backwater analysis is common to this computer package and the Hydrologic Engineering Center HEC-2 Water Surface Profiles package. Both computer packages produce the same calculations for open channel flow. The WSPRO package provides for improved hydraulic equations for flow through contractions or bridges, which does not apply to this study. The discharge of 5,550 cubic feet second is used for these water surface profile calculations. The flow regime was super critical and very uniform with a slight expansion indicated by the conveyance and Froude numbers. Cross sections 1, 2, 3, and 4 and propagated sections 5, 6, 7, and 8 are used for the water surface profile determinations. The propagated sections are based on section 4 and the valley slope between section 3 and 4. The propagated sections are used to obtain convergence of the computed profiles.

EVALUATION OF RESULTS. --Theoretical step-backwater analysis is rated good based upon comparison with the two slope areas. Fall, reach length, fall versus velocity head and conveyance ratios all are within acceptable limits. A U.S. Geological Survey streamflow gaging station (crest-stage gage) is about 3 miles

east of this Unnamed Arroyo. The station number is 08079300 Blackwater Draw near Floyd, NM. The predicted 100 year peak discharge for this basin is 8,710 cubic feet per second and has a drainage area of about 10 square miles. The maximum discharge for the period of record which began in 1963 is 3,400 cubic feet per second occurring September 1, 1969. Regional regression techniques are also applied to this site as presented by Waltemeyer, 1986. A 100-year peak discharge is determined at 3,280 cubic feet per second. Based upon the nearby gaging station record and the regional regression approach, the 100-year peak discharge of 5,550 cubic feet per second from the SCS method is very reasonable.

The plan view (page 45) shows the encroachment of the flood boundary on the open burn and open detonation pit. The northwest ground elevation from this survey showed a assumed elevation of 103.8 feet and the flood elevation is 102.98 feet. The south west corner ground elevation is 104.9 feet and the flood elevation is 105.25 feet at the right edge of water of section 1. Section 1 is located about mid distance between the north west and south west corner of the fence. The existing berm would need to be raised about 1 foot to contain this design 100 year flood discharge.

REFERENCES. --Miller, J.R., Frederick, R.H., and Tracy, R.J., 1973, Precipitation-frequency atlas of the western United States, volume Iv--New Mexico: National Oceanic and Atmospheric Administration NOAA Atlas 2, 43 p.

U.S. Army Corps of Engineers, 1990, HEC-1 Flood hydrograph package user's manual: Hydrologic Engineering Center, Davis, California, CPD-la, 283 p.

U.S. Soil Conservation Service, 1985, Peak rates of discharge for small watersheds: U.S. Department of Agriculture, Albuquerque, New Mexico, Engineering Field manual for Conservation Practices, 33p.

Waltemeyer, S.D., 1986, Techniques for estimating flood-flow frequency for unregulated streams in New Mexico: U.S. Geological Survey Water-Resources Investigations 86-4104, 56 p.

HYDROLOGIST. --Scott D. Waltemeyer composed this analysis. 1-30-1993.

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ID      MELROSE SUBBASIN:OVERLAND AND GULLIED
ID      CN 1838   NM209, CLOVIS-NORTH
ID      100 YEAR - 24 HOUR, RAINFALL EVENT
ID
I       RAINFALL DISTRIBUTION: BALANCED STORM
ID      RAINFALL DATA: NOAA ATLAS NO. 2, VOLUME IV-NEW MEXICO
ID      COMPUTATION INTERVAL: 5 MINUTE
IT     5        0        0     288
IO     0        2        0
KK    O1  OVERLAND BASIN
KO     0        0        0
BA   3.7
KM         100 YR. - 24 HR. EVENT
PH                  0.91    1.79    3.15    3.68    4.07    4.70    5.40    6.10
KM   SCS RUNOFF
LS             74    10.4
UD    1.57
KK     G1  GULLEY BASIN
BA    3.6
KM         100 YR. - 24 HR. EVENT
PH                  0.91    1.79    3.15    3.68    4.07    4.70    5.40    6.10
LS             74     4.5
UD    0.90
KK     G2  BASIN OUTLET
KO      4
KM       COMBINE HYDROGRAPHS OF SUBBAINS
HC      2
Z
```

FLOOD HYDROGRAPH PACKAGE (HEC-1)
SEPTEMBER 1990
VERSION 4.0

RUN DATE 01/21/1993 TIME 17:45:23

U.S. ARMY CORPS OF ENGINEERS
HYDROLOGIC ENGINEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X         XXXXX X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID        MELROSE SUBBASIN:OVERLAND AND GULLIED
   2          ID        CN 1838   NM209, CLOVIS-NORTH
   3          ID        100 YEAR - 24 HOUR, RAINFALL EVENT
   4          ID
   5          ID        RAINFALL DISTRIBUTION: BALANCED STORM
   6          ID        RAINFALL DATA: NOAA ATLAS NO. 2, VOLUME IV-NEW MEXICO
   7          ID        COMPUTATION INTERVAL: 5 MINUTE
   8          IT      5       0       0     288
   9          IO      0       2       0
  10          KK     01  OVERLAND BASIN
  11          KO      0       0       0
  12          BA    3.7
  13          KM          100 YR. - 24 HR. EVENT
  14          PH                  0.91    1.79    3.15    3.68    4.07    4.70    5.40    6.10
  15          KM    SCS RUNOFF
  16          LS              74    10.4
  17          UD    1.57
  18          KK     G1  GULLEY BASIN
  19          BA    3.6
  20          KM          100 YR. - 24 HR. EVENT
  21          PH                  0.91    1.79    3.15    3.68    4.07    4.70    5.40    6.10
  22          LS              74     4.5
  23          UD    0.90
  24          KK     G2  BASIN OUTLET
  25          KO      4
  26          KM       COMBINE HYDROGRAPHS OF SUBBASINS
  27          HC      2
  28          ZZ
```

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*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*           SEPTEMBER 1990             *
*             VERSION 4.0              *
*                                      *
*  RUN DATE  01/21/1993  TIME  17:45:23 *
*                                      *
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****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
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                           UNNAMED ARROYO ON MELROSE AIR FORCE RANGE
                           MELROSE SUBBASIN:OVERLAND AND GULLIED
                           CN 1838   NM209, CLOVIS-NORTH
                           100 YEAR - 24 HOUR, RAINFALL EVENT

                           RAINFALL DISTRIBUTION: BALANCED STORM
                           RAINFALL DATA: NOAA ATLAS NO. 2, VOLUME IV-NEW MEXICO
                           COMPUTATION INTERVAL: 5 MINUTE
  9 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           0  PRINT CONTROL
                      IPLOT           2  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT           HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         288  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1    0  ENDING DATE
                     NDTIME        2355  ENDING TIME
                     ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE   23.92 HOURS

       ENGLISH UNITS
            DRAINAGE AREA            SQUARE MILES
            PRECIPITATION DEPTH      INCHES
            LENGTH, ELEVATION        FEET
            FLOW                     CUBIC FEET PER SECOND
            STORAGE VOLUME           ACRE-FEET
            SURFACE AREA             ACRES
            TEMPERATURE              DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

9

```
          **************
          *            *
10 KK     *     01     *     OVERLAND BASIN
          *            *
          **************

11 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          0  PRINT CONTROL
                    IPLOT          2  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                          100 YR. - 24 HR. EVENT
                        SCS RUNOFF

               SUBBASIN RUNOFF DATA

12 BA          SUBBASIN CHARACTERISTICS
                    TAREA       3.70  SUBBASIN AREA

               PRECIPITATION DATA

14 PM                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                                                        TP-40                          TP-49
               ..... HYDRO-35 .....    ..............................    ..........    ..........
               5-MIN  15-MIN  60-MIN     2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .91    1.79    3.15     3.68    4.07    4.70    5.40    6.10     .00     .00     .00     .00

                                                STORM AREA =    3.70

16 LS          SCS LOSS RATE
                   STRTL        .70  INITIAL ABSTRACTION
                   CRVNBR     74.00  CURVE NUMBER
                   RTIMP      10.40  PERCENT IMPERVIOUS AREA

17 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG       1.50  LAG

                                          ***

                                        UNIT HYDROGRAPH
                                    92 END-OF-PERIOD ORDINATES
          19.     41.     85.    133.    189.    254.    329.    420.    520.    634.
         753.    855.    954.   1023.   1086.   1123.   1150.   1156.   1156.   1150.
        1123.   1086.   1043.    999.    949.    898.    835.    769.    694.    624.
         561.    509.    465.    426.    388.    356.    325.    302.    279.    256.
         234.    216.    197.    178.    163.    150.    138.    125.    116.    106.
          97.     88.     81.     74.     67.     61.     57.     52.     47.     44.
          40.     37.     33.     31.     28.     26.     24.     22.     20.     18.
          17.     15.     14.     13.     12.     11.     10.     10.      9.      8.
           7.      7.      6.      5.      5.      4.      3.      3.      2.      2.
           1.      0.
```

HYDROGRAPH AT STATION 01

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.
1		0005	2	.00	.00	.00	0.
1		0010	3	.00	.00	.00	0.
1		0015	4	.00	.00	.00	0.
1		0020	5	.00	.00	.00	0.
1		0025	6	.00	.00	.00	0.
1		0030	7	.00	.00	.00	0.
1		0035	8	.00	.00	.00	0.
1		0040	9	.00	.00	.00	1.
1		0045	10	.00	.00	.00	1.
1		0050	11	.00	.00	.00	1.
1		0055	12	.00	.00	.00	1.
1		0100	13	.00	.00	.00	2.
1		0105	14	.00	.00	.00	2.
1		0110	15	.00	.00	.00	2.
1		0115	16	.00	.00	.00	3.
1		0120	17	.00	.00	.00	3.
1		0125	18	.00	.00	.00	4.
1		0130	19	.00	.00	.00	4.
1		0135	20	.00	.00	.00	5.
1		0140	21	.00	.00	.00	5.
1		0145	22	.00	.00	.00	6.
1		0150	23	.00	.00	.00	6.
1		0155	24	.00	.00	.00	7.
1		0200	25	.00	.00	.00	7.
1		0205	26	.00	.00	.00	8.
1		0210	27	.00	.00	.00	8.
1		0215	28	.00	.00	.00	8.
1		0220	29	.00	.00	.00	9.
1		0225	30	.00	.00	.00	9.
1		0230	31	.00	.00	.00	9.
1		0235	32	.00	.00	.00	10.
1		0240	33	.00	.00	.00	10.
1		0245	34	.00	.00	.00	10.
1		0250	35	.00	.00	.00	10.
1		0255	36	.00	.00	.00	11.
1		0300	37	.00	.00	.00	11.
1		0305	38	.00	.00	.00	11.
1		0310	39	.00	.00	.00	11.
1		0315	40	.00	.00	.00	11.
1		0320	41	.00	.00	.00	12.
1		0325	42	.00	.00	.00	12.
1		0330	43	.01	.00	.00	12.
1		0335	44	.01	.00	.00	12.
1		0340	45	.01	.00	.00	12.
1		0345	46	.01	.00	.00	12.
1		0350	47	.01	.00	.00	12.
1		1200	145	.89	.27	.61	258.
1		1205	146	.35	.09	.26	321.
1		1210	147	.21	.05	.16	405.
1		1215	148	.14	.03	.11	504.
1		1220	149	.12	.03	.09	620.
1		1225	150	.10	.02	.08	754.
1		1230	151	.06	.01	.05	905.
1		1235	152	.05	.01	.04	1075.
1		1240	153	.05	.01	.04	1261.
1		1245	154	.04	.01	.03	1459.
1		1250	155	.04	.01	.03	1660.
1		1255	156	.04	.01	.03	1850.
1		1300	157	.04	.01	.03	2025.
1		1305	158	.04	.01	.03	2175.
1		1310	159	.03	.01	.03	2304.
1		1315	160	.03	.01	.03	2404.
1		1320	161	.03	.01	.03	2480.
1		1325	162	.03	.01	.02	2529.
1		1330	163	.02	.00	.02	2557.
1		1335	164	.02	.00	.02	2566.
1		1340	165	.02	.00	.02	2550.
1		1345	166	.02	.00	.02	2515.
1		1350	167	.02	.00	.02	2465.
1		1355	168	.02	.00	.02	2403.
1		1400	169	.02	.00	.02	2330.
1		1405	170	.02	.00	.01	2245.
1		1410	171	.02	.00	.01	2149.
1		1415	172	.02	.00	.01	2043.
1		1420	173	.02	.00	.01	1929.
1		1425	174	.02	.00	.01	1816.
1		1430	175	.02	.00	.01	1708.
1		1435	176	.02	.00	.01	1609.
1		1440	177	.01	.00	.01	1519.
1		1445	178	.01	.00	.01	1434.
1		1450	179	.01	.00	.01	1355.
1		1455	180	.01	.00	.01	1282.
1		1500	181	.01	.00	.01	1215.
1		1505	182	.01	.00	.01	1154.
1		1510	183	.01	.00	.01	1096.
1		1515	184	.01	.00	.01	1041.
1		1520	185	.01	.00	.01	988.
1		1525	186	.01	.00	.01	939.
1		1530	187	.01	.00	.01	892.
1		1535	188	.01	.00	.01	847.
1		1540	189	.01	.00	.01	806.
1		1545	190	.01	.00	.01	768.
1		1550	191	.01	.00	.01	732.

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0355	48	.01	.00	.00	13.	*	1		1555	192	.C1	.C0	.C1	698.
1		0400	49	.01	.00	.00	13.	*	1		1600	193	.C1	.00	.C1	667.
1		0405	50	.01	.00	.00	13.	*	1		1605	194	.C1	.C0	.C1	638.
1		0410	51	.01	.00	.00	13.	*	1		1610	195	.C1	.00	.C1	610.
1		0415	52	.01	.00	.00	13.	*	1		1615	196	.C1	.00	.C1	584.
1		0420	53	.01	.00	.00	13.	*	1		1620	197	.C1	.00	.C1	560.
1		0425	54	.01	.00	.00	13.	*	1		1625	198	.C1	.C0	.01	537.
1		0430	55	.01	.00	.00	14.	*	1		1630	199	.C1	.00	.01	515.
1		0435	56	.01	.01	.00	14.	*	1		1635	200	.C1	.C0	.01	495.
1		0440	57	.01	.01	.00	14.	*	1		1640	201	.C1	.00	.C1	477.
1		0445	58	.01	.01	.00	14.	*	1		1645	202	.C1	.00	.01	459.
1		0450	59	.01	.01	.00	14.	*	1		1650	203	.C1	.00	.C1	443.
1		0455	60	.01	.01	.00	14.	*	1		1655	204	.C1	.00	.C1	427.
1		0500	61	.01	.01	.00	14.	*	1		1700	205	.C1	.00	.01	413.
1		0505	62	.01	.01	.00	14.	*	1		1705	206	.01	.00	.01	399.
1		0510	63	.01	.01	.00	15.	*	1		1710	207	.C1	.00	.01	386.
1		0515	64	.01	.01	.00	15.	*	1		1715	208	.01	.00	.C1	374.
1		0520	65	.01	.01	.00	15.	*	1		1720	209	.C1	.00	.01	363.
1		0525	66	.01	.01	.00	15.	*	1		1725	210	.01	.00	.C1	352.
1		0530	67	.01	.01	.00	15.	*	1		1730	211	.C1	.C0	.C1	342.
1		0535	68	.01	.01	.00	15.	*	1		1735	212	.C1	.C0	.01	332.
1		0540	69	.01	.01	.00	15.	*	1		1740	213	.C1	.00	.C1	323.
1		0545	70	.01	.01	.00	16.	*	1		1745	214	.01	.00	.C1	315.
1		0550	71	.01	.01	.00	16.	*	1		1750	215	.C1	.00	.C1	307.
1		0555	72	.01	.01	.00	16.	*	1		1755	216	.C1	.00	.C1	299.
1		0600	73	.01	.01	.00	16.	*	1		1800	217	.C1	.00	.C1	292.
1		0605	74	.01	.01	.00	16.	*	1		1805	218	.C1	.00	.01	285.
1		0610	75	.01	.01	.00	16.	*	1		1810	219	.C1	.00	.C1	279.
1		0615	76	.01	.01	.00	16.	*	1		1815	220	.C1	.00	.01	273.
1		0620	77	.01	.01	.00	17.	*	1		1820	221	.C1	.C0	.01	267.
1		0625	78	.01	.01	.00	17.	*	1		1825	222	.C1	.C0	.C1	262.
1		0630	79	.01	.01	.00	17.	*	1		1830	223	.C1	.00	.01	256.
1		0635	80	.01	.01	.00	17.	*	1		1835	224	.C1	.00	.C1	251.
1		0640	81	.01	.01	.00	17.	*	1		1840	225	.C1	.C0	.C1	245.
1		0645	82	.01	.01	.00	18.	*	1		1845	226	.C1	.00	.01	240.
1		0650	83	.01	.01	.00	18.	*	1		1850	227	.C1	.C0	.C1	234.
1		0655	84	.01	.01	.00	18.	*	1		1855	228	.C1	.C0	.01	229.
1		0700	85	.01	.01	.00	18.	*	1		1900	229	.01	.C0	.00	224.
1		0705	86	.01	.01	.00	19.	*	1		1905	230	.C1	.C0	.CC	219.
1		0710	87	.01	.01	.00	19.	*	1		1910	231	.C1	.00	.C0	214.
1		0715	88	.01	.01	.00	19.	*	1		1915	232	.C1	.C0	.C0	209.
1		0720	89	.01	.01	.00	20.	*	1		1920	233	.C1	.00	.00	204.
1		0725	90	.01	.01	.00	20.	*	1		1925	234	.C1	.C0	.CC	200.
1		0730	91	.01	.01	.00	20.	*	1		1930	235	.C1	.C0	.CC	195.
1		0735	92	.01	.01	.00	21.	*	1		1935	236	.C1	.00	.CC	191.
1		0740	93	.01	.01	.00	21.	*	1		1940	237	.C1	.00	.CC	187.
1		0745	94	.01	.01	.00	21.	*	1		1945	238	.C1	.00	.00	184.
1		0750	95	.01	.01	.00	22.	*	1		1950	239	.C1	.C0	.CC	180.
1		0755	96	.01	.01	.00	22.	*	1		1955	240	.C1	.00	.C0	177.
1		0800	97	.01	.01	.00	22.	*	1		2000	241	.C1	.00	.00	174.
1		0805	98	.01	.01	.00	23.	*	1		2005	242	.C1	.00	.CC	171.
1		0810	99	.01	.01	.00	23.	*	1		2010	243	.C1	.C0	.CC	168.
1		0815	100	.01	.01	.00	24.	*	1		2015	244	.C1	.00	.CC	166.
1		0820	101	.01	.01	.00	24.	*	1		2020	245	.01	.00	.00	163.

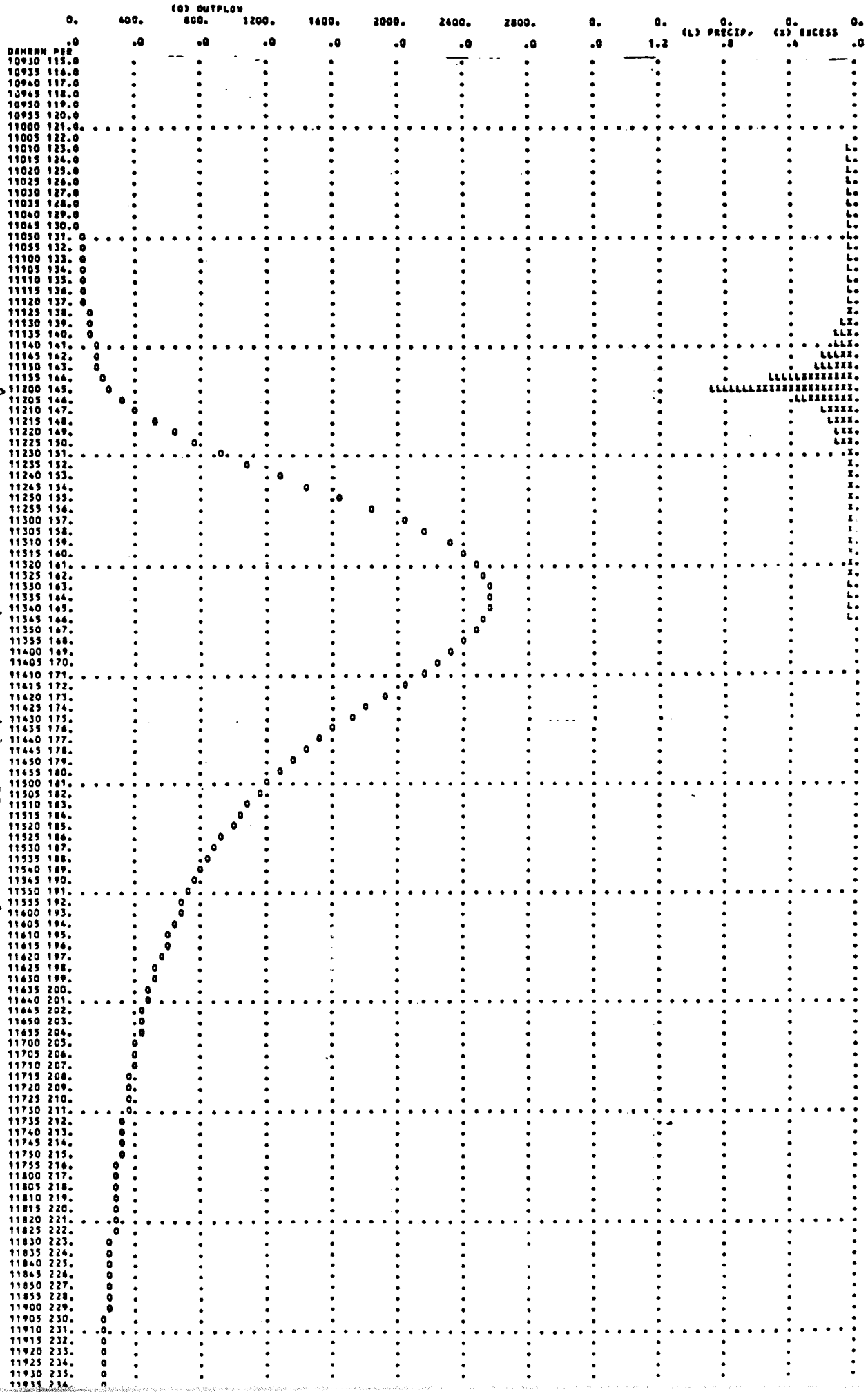
DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0825	102	.01	.01	.00	24.
1		0830	103	.01	.01	.00	25.
1		0835	104	.01	.01	.00	25.
1		0840	105	.01	.01	.00	25.
1		0845	106	.01	.01	.00	26.
1		0850	107	.01	.01	.00	26.
1		0855	108	.01	.01	.00	27.
1		0900	109	.01	.01	.00	27.
1		0905	110	.01	.01	.00	28.
1		0910	111	.01	.01	.00	28.
1		0915	112	.01	.01	.00	28.
1		0920	113	.02	.01	.00	29.
1		0925	114	.02	.01	.00	30.
1		0930	115	.02	.01	.00	30.
1		0935	116	.02	.01	.00	31.
1		0940	117	.02	.01	.00	32.
1		0945	118	.02	.01	.00	32.
1		0950	119	.02	.01	.00	33.
1		0955	120	.02	.01	.00	34.
1		1000	121	.02	.02	.00	36.
1		1005	122	.02	.02	.00	37.
1		1010	123	.02	.02	.00	39.
1		1015	124	.02	.02	.00	40.
1		1020	125	.02	.02	.01	42.
1		1025	126	.02	.02	.01	45.
1		1030	127	.03	.02	.01	47.
1		1035	128	.03	.02	.01	50.
1		1040	129	.03	.02	.01	53.
1		1045	130	.03	.02	.01	56.
1		1050	131	.03	.02	.01	60.
1		1055	132	.04	.03	.01	65.
1		1100	133	.04	.02	.01	70.
1		1105	134	.04	.03	.01	75.
1		1110	135	.04	.03	.01	82.
1		1115	136	.04	.03	.02	89.
1		1120	137	.05	.03	.02	96.
1		1125	138	.05	.03	.02	105.
1		1130	139	.10	.06	.04	115.
1		1135	140	.11	.06	.05	127.
1		1140	141	.13	.07	.06	141.
1		1145	142	.19	.10	.10	158.
1		1150	143	.24	.11	.13	180.
1		1155	144	.51	.20	.31	210.
1		2025	246	.01	.00	.00	161.
1		2030	247	.00	.00	.00	159.
1		2035	248	.00	.00	.00	157.
1		2040	249	.00	.00	.00	155.
1		2045	250	.00	.00	.00	153.
1		2050	251	.00	.00	.00	151.
1		2055	252	.00	.00	.00	149.
1		2100	253	.00	.00	.00	147.
1		2105	254	.00	.00	.00	145.
1		2110	255	.00	.00	.00	144.
1		2115	256	.00	.00	.00	142.
1		2120	257	.00	.00	.00	141.
1		2125	258	.00	.00	.00	139.
1		2130	259	.00	.00	.00	138.
1		2135	260	.00	.00	.00	136.
1		2140	261	.00	.00	.00	135.
1		2145	262	.00	.00	.00	134.
1		2150	263	.00	.00	.00	132.
1		2155	264	.00	.00	.00	131.
1		2200	265	.00	.00	.00	130.
1		2205	266	.00	.00	.00	129.
1		2210	267	.00	.00	.00	127.
1		2215	268	.00	.00	.00	126.
1		2220	269	.00	.00	.00	125.
1		2225	270	.00	.00	.00	124.
1		2230	271	.00	.00	.00	123.
1		2235	272	.00	.00	.00	122.
1		2240	273	.00	.00	.00	121.
1		2245	274	.00	.00	.00	120.
1		2250	275	.00	.00	.00	119.
1		2255	276	.00	.00	.00	118.
1		2300	277	.00	.00	.00	117.
1		2305	278	.00	.00	.00	116.
1		2310	279	.00	.00	.00	115.
1		2315	280	.00	.00	.00	115.
1		2320	281	.00	.00	.00	114.
1		2325	282	.00	.00	.00	113.
1		2330	283	.00	.00	.00	112.
1		2335	284	.00	.00	.00	111.
1		2340	285	.00	.00	.00	110.
1		2345	286	.00	.00	.00	110.
1		2350	287	.00	.00	.00	109.
1		2355	288	.00	.00	.00	108.

TOTAL RAINFALL = 6.07, TOTAL LOSS = 2.53, TOTAL EXCESS = 3.53

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	23.92-HR
2566.	13.58	(CFS)	1157.	345.	345.	345.
		(INCHES)	2.906	3.451	3.451	3.451
		(AC-FT)	574.	681.	681.	681.

CUMULATIVE AREA = 3.70 SQ MI

STATION 01



Unnamed arroyo - Melrose Air Force Range
Overland flow Hydrograph

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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
18 KK     *     G1     *      GULLEY BASIN
          *            *
          **************
                                100 YR. - 24 HR. EVENT

     SUBBASIN RUNOFF DATA

19 BA       SUBBASIN CHARACTERISTICS
                 TAREA         3.60  SUBBASIN AREA

            PRECIPITATION DATA

21 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
            ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
            5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
              .91    1.79    3.15    3.68    4.07    4.70    5.40    6.10     .00     .00     .00     .00

                                                 STORM AREA =    3.60

22 LS       SCS LOSS RATE
                 STRTL          .70  INITIAL ABSTRACTION
                CRVNBR        74.00  CURVE NUMBER
                 RTIMP         4.50  PERCENT IMPERVIOUS AREA

23 UD       SCS DIMENSIONLESS UNITGRAPH
                 TLAG          .90  LAG

                                                  ***

                                              UNIT HYDROGRAPH
                                          56 END-OF-PERIOD ORDINATES
     49.     155.     293.     470.     698.     976.    1276.    1530.    1710.    1811.
   1841.    1835.    1772.    1667.    1547.    1411.    1246.    1050.     884.     759.
    655.     566.     493.     433.     375.     326.     277.     243.     210.     182.
    158.     136.     118.     100.      88.      76.      66.      57.      50.      43.
     37.      32.      27.      24.      21.      19.      17.      15.      13.      11.
      9.       7.       6.       4.       2.       1.
```

HYDROGRAPH AT STATION G1

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	1		1200	145	.89	.29	.60	502.
1		0005	2	.00	.00	.00	0.	1		1205	146	.35	.09	.26	694.
1		0010	3	.00	.00	.00	0.	1		1210	147	.21	.05	.16	942.
1		0015	4	.00	.00	.00	0.	1		1215	148	.14	.03	.11	1247.
1		0020	5	.00	.00	.00	0.	1		1220	149	.12	.03	.09	1610.
1		0025	6	.00	.00	.00	0.	1		1225	150	.10	.02	.08	2018.
1		0030	7	.00	.00	.00	0.	1		1230	151	.06	.01	.05	2435.
1		0035	8	.00	.00	.00	1.	1		1235	152	.05	.01	.04	2812.
1		0040	9	.00	.00	.00	1.	1		1240	153	.05	.01	.04	3114.
1		0045	10	.00	.00	.00	1.	1		1245	154	.04	.01	.03	3327.
1		0050	11	.00	.00	.00	2.	1		1250	155	.04	.01	.03	3453.
1		0055	12	.00	.00	.00	2.	1		1255	156	.04	.01	.03	3501.
1		0100	13	.00	.00	.00	2.	1		1300	157	.04	.01	.03	3472.
1		0105	14	.00	.00	.00	3.	1		1305	158	.04	.01	.03	3376.
1		0110	15	.00	.00	.00	3.	1		1310	159	.03	.01	.03	3234.
1		0115	16	.00	.00	.00	3.	1		1315	160	.03	.01	.03	3052.
1		0120	17	.00	.00	.00	3.	1		1320	161	.03	.01	.02	2832.
1		0125	18	.00	.00	.00	4.	1		1325	162	.03	.01	.02	2589.
1		0130	19	.00	.00	.00	4.	1		1330	163	.02	.00	.02	2358.
1		0135	20	.00	.00	.00	4.	1		1335	164	.02	.00	.02	2152.
1		0140	21	.00	.00	.00	4.	1		1340	165	.02	.00	.02	1969.
1		0145	22	.00	.00	.00	4.	1		1345	166	.02	.00	.02	1804.
1		0150	23	.00	.00	.00	4.	1		1350	167	.02	.00	.02	1659.
1		0155	24	.00	.00	.00	4.	1		1355	168	.02	.00	.02	1529.
1		0200	25	.00	.00	.00	5.	1		1400	169	.02	.00	.02	1410.
1		0205	26	.00	.00	.00	5.	1		1405	170	.02	.00	.01	1301.
1		0210	27	.00	.00	.00	5.	1		1410	171	.02	.00	.01	1200.
1		0215	28	.00	.00	.00	5.	1		1415	172	.02	.00	.01	1111.
1		0220	29	.00	.00	.00	5.	1		1420	173	.02	.00	.01	1030.
1		0225	30	.00	.00	.00	5.	1		1425	174	.02	.00	.01	956.
1		0230	31	.00	.00	.00	5.	1		1430	175	.02	.00	.01	889.
1		0235	32	.00	.00	.00	5.	1		1435	176	.02	.00	.01	828.
1		0240	33	.00	.00	.00	5.	1		1440	177	.01	.00	.01	773.
1		0245	34	.00	.00	.00	5.	1		1445	178	.01	.00	.01	723.
1		0250	35	.00	.00	.00	5.	1		1450	179	.01	.00	.01	679.
1		0255	36	.00	.00	.00	5.	1		1455	180	.01	.00	.01	639.
1		0300	37	.00	.00	.00	5.	1		1500	181	.01	.00	.01	604.
1		0305	38	.00	.00	.00	5.	1		1505	182	.01	.00	.01	572.
1		0310	39	.00	.00	.00	5.	1		1510	183	.01	.00	.01	543.
1		0315	40	.00	.00	.00	6.	1		1515	184	.01	.00	.01	516.
1		0320	41	.00	.00	.00	6.	1		1520	185	.01	.00	.01	492.
1		0325	42	.00	.00	.00	6.	1		1525	186	.01	.00	.01	470.
1		0330	43	.01	.00	.00	6.	1		1530	187	.01	.00	.01	449.
1		0335	44	.01	.00	.00	6.	1		1535	188	.01	.00	.01	431.
1		0340	45	.01	.00	.00	6.	1		1540	189	.01	.00	.01	414.
1		0345	46	.01	.00	.00	6.	1		1545	190	.01	.00	.01	398.
1		0350	47	.01	.00	.00	6.	1		1550	191	.01	.00	.01	384.
1		0355	48	.01	.00	.00	6.	1		1555	192	.01	.00	.01	370.
1		0400	49	.01	.01	.00	6.	1		1600	193	.01	.00	.01	358.
1		0405	50	.01	.01	.00	6.	1		1605	194	.01	.00	.01	346.
1		0410	51	.01	.01	.00	6.	1		1610	195	.01	.00	.01	334.

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0415	52	.01	.01	.00	6.	*	1		1615	196	.C1	.00	.C1	324.
1		0420	53	.01	.01	.00	6.	*	1		1620	197	.C1	.00	.01	313.
1		0425	54	.01	.01	.00	6.	*	1		1625	198	.C1	.00	.01	304.
1		0430	55	.01	.01	.00	6.	*	1		1630	199	.01	.C0	.01	295.
1		0435	56	.01	.01	.00	6.	*	1		1635	200	.C1	.00	.C1	286.
1		0440	57	.01	.01	.00	6.	*	1		1640	201	.C1	.00	.01	279.
1		0445	58	.01	.01	.00	6.	*	1		1645	202	.C1	.00	.C1	273.
1		0450	59	.01	.01	.00	6.	*	1		1650	203	.C1	.C0	.C1	267.
1		0455	60	.01	.01	.00	6.	*	1		1655	204	.C1	.C0	.01	261.
1		0500	61	.01	.01	.00	7.	*	1		1700	205	.C1	.00	.C1	256.
1		0505	62	.01	.01	.00	7.	*	1		1705	206	.C1	.C0	.C1	251.
1		0510	63	.01	.01	.00	7.	*	1		1710	207	.C1	.00	.C1	247.
1		0515	64	.01	.01	.00	7.	*	1		1715	208	.C1	.00	.C1	243.
1		0520	65	.01	.01	.00	7.	*	1		1720	209	.C1	.C0	.C1	238.
1		0525	66	.01	.01	.00	7.	*	1		1725	210	.C1	.C0	.01	234.
1		0530	67	.01	.01	.00	7.	*	1		1730	211	.01	.00	.C1	231.
1		0535	68	.01	.01	.00	7.	*	1		1735	212	.C1	.00	.C1	227.
1		0540	69	.01	.01	.00	7.	*	1		1740	213	.C1	.00	.C1	224.
1		0545	70	.01	.01	.00	7.	*	1		1745	214	.C1	.00	.C1	220.
1		0550	71	.01	.01	.00	7.	*	1		1750	215	.C1	.00	.C1	217.
1		0555	72	.01	.01	.00	7.	*	1		1755	216	.C1	.00	.C1	214.
1		0600	73	.01	.01	.00	7.	*	1		1800	217	.C1	.00	.C1	211.
1		0605	74	.01	.01	.00	7.	*	1		1805	218	.01	.C0	.C1	208.
1		0610	75	.01	.01	.00	7.	*	1		1810	219	.01	.00	.01	205.
1		0615	76	.01	.01	.00	8.	*	1		1815	220	.01	.00	.01	202.
1		0620	77	.01	.01	.00	8.	*	1		1820	221	.01	.00	.C1	199.
1		0625	78	.01	.01	.00	8.	*	1		1825	222	.01	.00	.C1	195.
1		0630	79	.01	.01	.00	8.	*	1		1830	223	.01	.00	.C1	192.
1		0635	80	.01	.01	.00	8.	*	1		1835	224	.01	.00	.01	188.
1		0640	81	.01	.01	.00	8.	*	1		1840	225	.01	.C0	.C1	185.
1		0645	82	.01	.01	.00	8.	*	1		1845	226	.C1	.00	.01	181.
1		0650	83	.01	.01	.00	9.	*	1		1850	227	.C1	.C0	.C1	178.
1		0655	84	.01	.01	.00	9.	*	1		1855	228	.C1	.00	.00	174.
1		0700	85	.01	.01	.00	9.	*	1		1900	229	.01	.C0	.CC	171.
1		0705	86	.01	.01	.00	9.	*	1		1905	230	.C1	.00	.C0	167.
1		0710	87	.01	.01	.00	9.	*	1		1910	231	.C1	.00	.CC	164.
1		0715	88	.01	.01	.00	9.	*	1		1915	232	.C1	.C0	.C0	161.
1		0720	89	.01	.01	.00	10.	*	1		1920	233	.01	.00	.C0	159.
1		0725	90	.01	.01	.00	10.	*	1		1925	234	.C1	.00	.CC	156.
1		0730	91	.01	.01	.00	10.	*	1		1930	235	.C1	.00	.C0	154.
1		0735	92	.01	.01	.00	10.	*	1		1935	236	.C1	.00	.CC	151.
1		0740	93	.01	.01	.00	10.	*	1		1940	237	.C1	.00	.CC	149.
1		0745	94	.01	.01	.00	10.	*	1		1945	238	.C1	.00	.00	147.
1		0750	95	.01	.01	.00	11.	*	1		1950	239	.C1	.00	.CC	146.
1		0755	96	.01	.01	.00	11.	*	1		1955	240	.C1	.00	.00	144.
1		0800	97	.01	.01	.00	11.	*	1		2000	241	.C1	.00	.C0	142.
1		0805	98	.01	.01	.00	11.	*	1		2005	242	.C1	.C0	.00	140.
1		0810	99	.01	.01	.00	11.	*	1		2010	243	.C1	.00	.C0	139.
1		0815	100	.01	.01	.00	11.	*	1		2015	244	.C1	.00	.C0	137.
1		0820	101	.01	.01	.00	11.	*	1		2020	245	.C1	.C0	.CC	136.
1		0825	102	.01	.01	.00	12.	*	1		2025	246	.C1	.00	.C0	134.
1		0830	103	.01	.01	.00	12.	*	1		2030	247	.C0	.00	.C0	133.
1		0835	104	.01	.01	.00	12.	*	1		2035	248	.C0	.C0	.CC	132.
1		0840	105	.01	.01	.00	12.	*	1		2040	249	.C0	.C0	.C0	130.
1		0845	106	.01	.01	.00	12.	*	1		2045	250	.CC	.00	.C0	129.
1		0850	107	.01	.01	.00	13.	*	1		2050	251	.0C	.00	.00	128.

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0855	108	.01	.01	.00	13.
1		0900	109	.01	.01	.00	13.
1		0905	110	.01	.01	.00	13.
1		0910	111	.01	.01	.00	14.
1		0915	112	.01	.01	.00	14.
1		0920	113	.02	.01	.00	14.
1		0925	114	.02	.01	.00	15.
1		0930	115	.02	.01	.00	15.
1		0935	116	.02	.01	.00	16.
1		0940	117	.02	.01	.00	17.
1		0945	118	.02	.02	.00	19.
1		0950	119	.02	.02	.00	20.
1		0955	120	.02	.02	.00	22.
1		1000	121	.02	.02	.00	24.
1		1005	122	.02	.02	.00	27.
1		1010	123	.02	.02	.00	29.
1		1015	124	.02	.02	.00	32.
1		1020	125	.02	.02	.00	36.
1		1025	126	.02	.02	.00	40.
1		1030	127	.03	.02	.01	44.
1		1035	128	.03	.02	.01	49.
1		1040	129	.03	.02	.01	54.
1		1045	130	.03	.03	.01	60.
1		1050	131	.03	.03	.01	67.
1		1055	132	.04	.03	.01	75.
1		1100	133	.04	.03	.01	84.
1		1105	134	.04	.03	.01	94.
1		1110	135	.04	.03	.01	105.
1		1115	136	.04	.03	.01	117.
1		1120	137	.05	.03	.02	131.
1		1125	138	.05	.04	.02	146.
1		1130	139	.10	.06	.04	164.
1		1135	140	.11	.07	.04	185.
1		1140	141	.13	.07	.06	212.
1		1145	142	.19	.10	.09	248.
1		1150	143	.24	.12	.13	297.
1		1155	144	.51	.21	.29	373.
1		2055	252	.CC	.CO	.CC	127.
1		2100	253	.CO	.00	.OC	126.
1		2105	254	.00	.00	.00	125.
1		2110	255	.CC	.CO	.OC	124.
1		2115	256	.CO	.00	.CC	122.
1		2120	257	.CC	.00	.00	121.
1		2125	258	.CC	.00	.CO	120.
1		2130	259	.CC	.00	.CO	119.
1		2135	260	.CO	.00	.CO	118.
1		2140	261	.CC	.00	.OC	118.
1		2145	262	.CO	.00	.00	117.
1		2150	263	.CC	.00	.CO	116.
1		2155	264	.CC	.00	.00	115.
1		2200	265	.CC	.00	.OC	114.
1		2205	266	.CO	.00	.CC	113.
1		2210	267	.CO	.00	.00	112.
1		2215	268	.CC	.00	.CO	111.
1		2220	269	.CO	.CO	.CO	111.
1		2225	270	.CO	.00	.OC	110.
1		2230	271	.CC	.CO	.CC	109.
1		2235	272	.CO	.CO	.00	108.
1		2240	273	.CO	.CO	.CC	107.
1		2245	274	.CO	.00	.OC	107.
1		2250	275	.CO	.CO	.CC	106.
1		2255	276	.CC	.00	.00	105.
1		2300	277	.CC	.00	.CO	104.
1		2305	278	.CC	.00	.00	104.
1		2310	279	.CC	.CO	.CO	103.
1		2315	280	.00	.CO	.00	102.
1		2320	281	.CC	.CO	.CC	102.
1		2325	282	.CO	.CO	.OC	101.
1		2330	283	.CC	.CO	.CO	100.
1		2335	284	.CO	.00	.OC	100.
1		2340	285	.CC	.00	.00	99.
1		2345	286	.CO	.00	.CC	98.
1		2350	287	.CO	.00	.OC	98.
1		2355	288	.00	.CO	.OC	97.

TOTAL RAINFALL = 6.07, TOTAL LOSS = 2.70, TOTAL EXCESS = 3.37

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	23.92-HR
(CFS)	(HR)					
		(CFS)				
3501.	12.92		1105.	323.	323.	323.
		(INCHES)	2.854	3.321	3.321	3.321
		(AC-FT)	548.	638.	638.	638.

CUMULATIVE AREA = 3.60 SQ MI

Unnamed Arroyo - Malrose Air Force Range
Channel or gully flow hydrograph
(O) OUTFLOW
0. 400. 800. 1200. 1600. 2000. 2400. 2800. 3200. 3600.
(L) PRECIP. (X) EXCESS
0. .4 .8 1.2
STATION 61

```
24 KK          G2          BASIN OUTLET

25 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          4  PRINT CONTROL
                    IPLOT          2  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
               COMBINE HYDROGRAPHS OF SUBBAINS

27 HC          HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
```

STATION G2

(Q) OUTFLOW

0. 1000. 2000. 3000. 4000. 5000. 6000. 0. 0. 0. 0. 0. 0.

DAHRMN PER

11000 121.0.
11005 122.0
11010 123.0
11015 124.0
11020 125.0
11025 126.0
11030 127.0
11035 128.0
11040 129.0
11045 130.0
11050 131.0.
11055 132.0
11100 133. 0
11105 134. 0
11110 135. 0
11115 136. 0
11120 137. 0
11125 138. 0
11130 139. 0
11135 140. 0
11140 141. 0
11145 142. 0
11150 143. 0
11155 144. 0
11200 145. 0
11205 146. 0
11210 147. 0
11215 148. 0
11220 149. 0
11225 150. 0
11230 151. 0
11235 152. 0
11240 153. 0
11245 154. 0
11250 155. 0
11255 156. 0
11300 157. 0
11305 158. 0
11310 159. 0
11315 160. 0
11320 161. 0
11325 162. 0
11330 163. 0
11335 164. 0
11340 165. 0
11345 166. 0
11350 167. 0
11355 168. 0
11400 169. 0
11405 170. 0
11410 171. 0
11415 172. 0
11420 173. 0
11425 174. 0
11430 175. 0
11435 176. 0
11440 177. 0
11445 178. 0
11450 179. 0
11455 180. 0
11500 181. 0
11505 182. 0
11510 183. 0
11515 184. 0
11520 185. 0
11525 186. 0
11530 187. 0
11535 188. 0
11540 189. 0
11545 190. 0
11550 191. 0
11555 192. 0
11600 193. 0
11605 194. 0
11610 195. 0
11615 196. 0
11620 197. 0
11625 198. 0
11630 199. 0
11635 200. 0
11640 201. 0
11645 202. 0
11650 203. 0
11655 204. 0
11700 205. 0
11705 206. 0
11710 207. 0
11715 208. 0
11720 209. 0
11725 210. 0
11730 211. 0
11735 212. 0
11740 213. 0
11745 214. 0
11750 215. 0
11755 216. 0
11800 217. 0
11805 218. 0
11810 219. 0
11815 220. 0

Unnamed arroyo – Melrose Air Force Range
overland flow plus channel flow hydrograph

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	01	2566.	13.58	1157.	345.	345.	3.70		
HYDROGRAPH AT	G1	3501.	12.92	1105.	323.	323.	3.60		
2 COMBINED AT	G2	5552.	13.08	2258.	667.	667.	7.30		

*** NORMAL END OF HEC-1 ***

```
T1          UNNAMED ARROYO (MELROSE BOMBING RANGE)
J1          0.05,.10,.02,1.0
J3          3 23 26 6 16 17 5 28 27 29 30 14 15 13  *
*
D           5550
SK            .002
XT    4     1940 * * * .009
GR          0,101.6 50,101.1 262,97.9 296,95.2 334,97.8 503,98.3 743,97.6
N           .022
XS    8     3300 * * * .009
GT          -12.8
N           .022
XS    7     2960  * * * .009
GT          -9.6
N           .022
XS    6     2620 * * * .009
GT          -6.4
N           .022
XS    5     2280 * * * .009
GT          -3.2
N           .022
XS    4     1940
GT
N           .022
XS    3     1600
GR          0,105.4 230,102.1 380,101.1 556,99.7 672,99.5 723,98.4 821,101.1
GR          975,102.4 1084,102.3 2000,102.6
N           .022,.024
SA          1000
XS    2     1090
GR          0,106.4 67,105.7 257,104.1 387,102.0 482,98.9 552,99.8 690,104.0
GR          803,103.9 1009,103.4 2000,104.2
N           .022, .024
SA          700
XS    1     485
GR          0,110.6 243,109.2 448,106.9 536,105.1 613,99.9 673,101.8 864,107.3
GR          1036,107.0 1252,105.7 1482,104.8 2000,106.2
N           .022, .024
SA          865
PX    1
PX    2
PX    3
PX    4
PX    5
PX    6
PX    7
PX    8
EX          1
ER
```

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188            MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

           *** RUN DATE & TIME: 01-29-93  13:03

  T1         UNNAMED ARROYO (MELROSE BOMBING RANGE)
  J1         0.05,.10,.02,1.0

J1 RECORD PARAMETERS:
DELTAY = 0.05    YTOL = 0.10    QTOL = 0.02    FNTEST = 1.00    IHFNOJ = -1

  J3         3 23 26 6 16 17 5 28 27 29 30 14 15 13  *
  *
  Q          5550
*** Q-DATA FOR SEC-ID, ISEQ =              1
  SK          .002
```

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188            MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

        UNNAMED ARROYO (MELROSE BOMBING RANGE)
           *** RUN DATE & TIME: 01-29-93  13:03

*** START PROCESSING CROSS SECTION - "4     "
  XT    4     1940 * * * .009
+++014 WARNING:  EXCESS DATA ITEMS IGNORED.
  GR          0,101.6 50,101.1 262,97.9 296,95.2 334,97.8 503,98.3 743,97.6
  N           .022

*** FINISH PROCESSING CROSS SECTION - "4     "
*** TEMPLATE CROSS SECTION "4     " SAVED INTERNALLY.
```

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188            MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

        UNNAMED ARROYO (MELROSE BOMBING RANGE)
           *** RUN DATE & TIME: 01-29-93  13:03

*** START PROCESSING CROSS SECTION - "8     "
  XS   8     3300 * * * .009
  GT          -12.8
  N           .022

*** FINISH PROCESSING CROSS SECTION - "8     "
*** CROSS SECTION "8     " WRITTEN TO DISK, RECORD NO. =  1

--- DATA SUMMARY FOR SECID "8     " AT SRD =    3300.  ERR-CODE =       0

     SKEW      IHFNO     VSLOPE         EK         CK
      0.0         0.     0.0090       0.50       0.00

X-Y COORDINATE PAIRS  (NGP =   7):
       X       Y          X       Y          X       Y          X       Y
     0.0    88.80       50.0    88.30      262.0    85.10      296.0    82.40
   334.0    85.00      503.0    85.50      743.0    84.80

 X-   AX-MIN POINTS:
    XMIN       Y          X     YMIN       XMAX       Y          X     YMAX
     0.0    88.80      296.0    82.40      743.0    84.80        0.0    88.80

ROUGHNESS COEFFICIENTS (NSA =  1):
        0.022
```

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188             MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

        UNNAMED ARROYO (MELROSE BOMBING RANGE)
           *** RUN DATE & TIME: 01-29-93  13:03

*** START PROCESSING CROSS SECTION - "7     "
  XS   7    2960  * * * .009
  GT         -9.6
  N          .022

*** FINISH PROCESSING CROSS SECTION - "7     "
*** CROSS SECTION "7     " WRITTEN TO DISK, RECORD NO. =  2

--- DATA SUMMARY FOR SECID "7     " AT SRD =   2960.  ERR-CODE =      0

     SKEW      IHFNO     VSLOPE        EK         CK
      0.0         0.     0.0090      0.50       0.00

X-Y COORDINATE PAIRS  (NGP =   7):
       X      Y          X      Y          X      Y          X      Y
     0.0   92.00       50.0   91.50      262.0  88.30      296.0  85.60
   334.0   88.20      503.0   88.70      743.0  88.00

 X-   AX-MIN POINTS:
     XMIN       Y          X    YMIN       XMAX       Y          X    YMAX
      0.0   92.00      296.0   85.60      743.0  88.00        0.0   92.00

ROUGHNESS COEFFICIENTS (NSA =  1):
        0.022
```

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188             MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

         UNNAMED ARROYO (MELROSE BOMBING RANGE)
            *** RUN DATE & TIME: 01-29-93  13:03

*** START PROCESSING CROSS SECTION - "6     "
  XS   6     2620 * * * .009
  GT         -6.4
  N          .022

*** FINISH PROCESSING CROSS SECTION - "6     "
*** CROSS SECTION "6     " WRITTEN TO DISK, RECORD NO. =  3

--- DATA SUMMARY FOR SECID "6     " AT SRD =    2620.  ERR-CODE =       0

     SKEW       IHFNO     VSLOPE         EK         CK
      0.0          0.     0.0090       0.50       0.00

X-Y COORDINATE PAIRS  (NGP =   7):
       X      Y          X      Y          X      Y          X      Y
     0.0   95.20       50.0   94.70      262.0  91.50      296.0  88.80
   334.0   91.40      503.0   91.90      743.0  91.20

 X-Y  AX-MIN POINTS:
     MIN       Y          X    YMIN       XMAX       Y          X    YMAX
     0.0   95.20      296.0   88.80      743.0  91.20        0.0  95.20

ROUGHNESS COEFFICIENTS (NSA =  1):
       0.022
```

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188           MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

        UNNAMED ARROYO (MELROSE BOMBING RANGE)
           *** RUN DATE & TIME: 01-29-93  13:03

*** START PROCESSING CROSS SECTION - "5     "
  XS   5    2280 * * * .009
  GT         -3.2
  N           .022

*** FINISH PROCESSING CROSS SECTION - "5     "
*** CROSS SECTION "5     " WRITTEN TO DISK, RECORD NO. =  4

--- DATA SUMMARY FOR SECID "5     " AT SRD =   2280.  ERR-CODE =       0

     SKEW      IHFNO     VSLOPE         EK         CK
      0.0         0.     0.0090       0.50       0.00

X-Y COORDINATE PAIRS  (NGP =   7):
       X         Y          X         Y          X         Y          X         Y
     0.0     98.40       50.0     97.90      262.0     94.70      296.0     92.00
   334.0     94.60      503.0     95.10      743.0     94.40

 X-   AX-MIN POINTS:
     XMIN         Y          X      YMIN       XMAX         Y          X      YMAX
      0.0     98.40      296.0     92.00      743.0     94.40        0.0     98.40

ROUGHNESS COEFFICIENTS (NSA =  1):
        0.022
```

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188             MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

         UNNAMED ARROYO (MELROSE BOMBING RANGE)
            *** RUN DATE & TIME: 01-29-93  13:03

*** START PROCESSING CROSS SECTION - "4     "
  XS   4     1940
  GT
  N           .022

*** FINISH PROCESSING CROSS SECTION - "4     "
*** CROSS SECTION "4     " WRITTEN TO DISK, RECORD NO. =  5

--- DATA SUMMARY FOR SECID "4     " AT SRD =    1940.  ERR-CODE =       0

     SKEW       IHFNO     VSLOPE         EK         CK
      0.0          0.     0.0090       0.50       0.00

X-Y COORDINATE PAIRS  (NGP =   7):
       X       Y          X       Y          X       Y          X       Y
     0.0  101.60       50.0  101.10      262.0   97.90      296.0   95.20
   334.0   97.80      503.0   98.30      743.0   97.60

 X-Y  \X-MIN POINTS:
     XMIN       Y          X    YMIN       XMAX       Y          X    YMAX
      0.0  101.60      296.0   95.20      743.0   97.60        0.0  101.60

ROUGHNESS COEFFICIENTS (NSA =  1):
        0.022
```

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188            MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

        UNNAMED ARROYO (MELROSE BOMBING RANGE)
          *** RUN DATE & TIME: 01-29-93  13:03

*** START PROCESSING CROSS SECTION - "3     "
  XS   3     1600
  GR         0,105.4 230,102.1 380,101.1 556,99.7 672,99.5 723,98.4 821,101.1
  GR         975,102.4 1084,102.3 2000,102.6
  N          .022,.024
  SA         1000

*** FINISH PROCESSING CROSS SECTION - "3     "
*** CROSS SECTION "3     " WRITTEN TO DISK, RECORD NO. =  6

--- DATA SUMMARY FOR SECID "3     " AT SRD =    1600.  ERR-CODE =       0

     SKEW      IHFNO     VSLOPE         EK         CK
      0.0         0.     0.0090       0.50       0.00

X-Y COORDINATE PAIRS  (NGP =  10):
       X      Y          X      Y          X      Y          X      Y
     0.0  105.40      230.0  102.10     380.0  101.10     556.0   99.70
     2.0   99.50      723.0   98.40     821.0  101.10     975.0  102.40
    4.0  102.30     2000.0  102.60

 X-Y MAX-MIN POINTS:
     XMIN       Y          X     YMIN       XMAX       Y          X     YMAX
      0.0  105.40      723.0    98.40     2000.0  102.60        0.0  105.40

SUBAREA BREAKPOINTS (NSA =  2):
       1000.

ROUGHNESS COEFFICIENTS (NSA =  2):
        0.022   0.024
```

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WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188            MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

        UNNAMED ARROYO (MELROSE BOMBING RANGE)
           *** RUN DATE & TIME: 01-29-93  13:03

*** START PROCESSING CROSS SECTION - "2     "
  XS   2     1090
  GR          0,106.4 67,105.7 257,104.1 387,102.0 482,98.9 552,99.8 690,104.0
  GR          803,103.9 1009,103.4 2000,104.2
  N           .022, .024
  SA          700

*** FINISH PROCESSING CROSS SECTION - "2     "
*** CROSS SECTION "2     " WRITTEN TO DISK, RECORD NO. =  7

--- DATA SUMMARY FOR SECID "2     " AT SRD =    1090.  ERR-CODE =       0

     SKEW      IHFNO     VSLOPE         EK         CK
      0.0         0.     0.0090       0.50       0.00

X-Y COORDINATE PAIRS  (NGP =  10):
       X      Y          X      Y          X      Y          X      Y
      0.0  106.40       67.0  105.70      257.0  104.10      387.0  102.00
     `2.0   98.90      552.0   99.80      690.0  104.00      803.0  103.90
   . ,9.0  103.40     2000.0  104.20

 X-Y MAX-MIN POINTS:
     XMIN       Y          X    YMIN       XMAX       Y          X    YMAX
      0.0  106.40      482.0   98.90     2000.0  104.20        0.0  106.40

SUBAREA BREAKPOINTS (NSA =  2):
        700.

ROUGHNESS COEFFICIENTS (NSA =  2):
        0.022   0.024
```

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188           MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

        UNNAMED ARROYO (MELROSE BOMBING RANGE)
          *** RUN DATE & TIME: 01-29-93  13:03

*** START PROCESSING CROSS SECTION - "1     "
  XS   1     485
  GR          0,110.6 243,109.2 448,106.9 536,105.1 613,99.9 673,101.8 864,107.3
  GR          1036,107.0 1252,105.7 1482,104.8 2000,106.2
  N           .022, .024
  SA          865
  PX   1

*** FINISH PROCESSING CROSS SECTION - "1     "
*** CROSS SECTION "1     " WRITTEN TO DISK, RECORD NO. =  8

--- DATA SUMMARY FOR SECID "1     " AT SRD =     485.  ERR-CODE =       0

     SKEW       IHFNO      VSLOPE          EK          CK
      0.0          0.      0.0090        0.50        0.00

X-Y COORDINATE PAIRS  (NGP =  11):
       X       Y          X       Y          X       Y          X       Y
     0.0   110.60      243.0   109.20      448.0   106.90      536.0   105.10
     3.0    99.90      673.0   101.80      864.0   107.30     1036.0   107.00
  1252.0   105.70     1482.0   104.80     2000.0   106.20

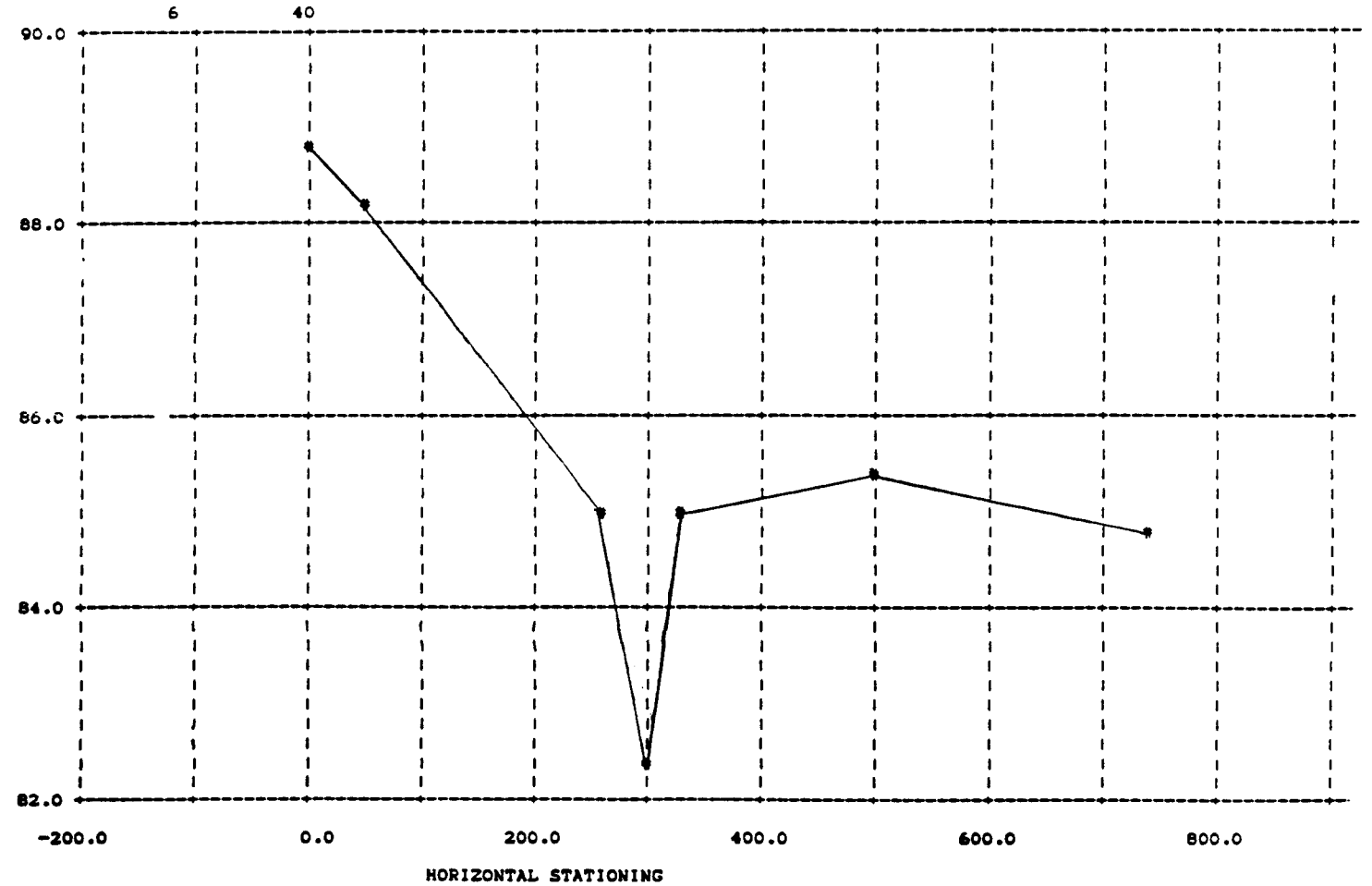
 X-Y MAX-MIN POINTS:
     XMIN        Y          X      YMIN       XMAX        Y          X      YMAX
      0.0   110.60      613.0     99.90     2000.0   106.20        0.0   110.60

SUBAREA BREAKPOINTS (NSA =  2):
        865.

ROUGHNESS COEFFICIENTS (NSA =  2):
        0.022   0.024
```

Unnamed Arroyo - Melrose Air Force Range

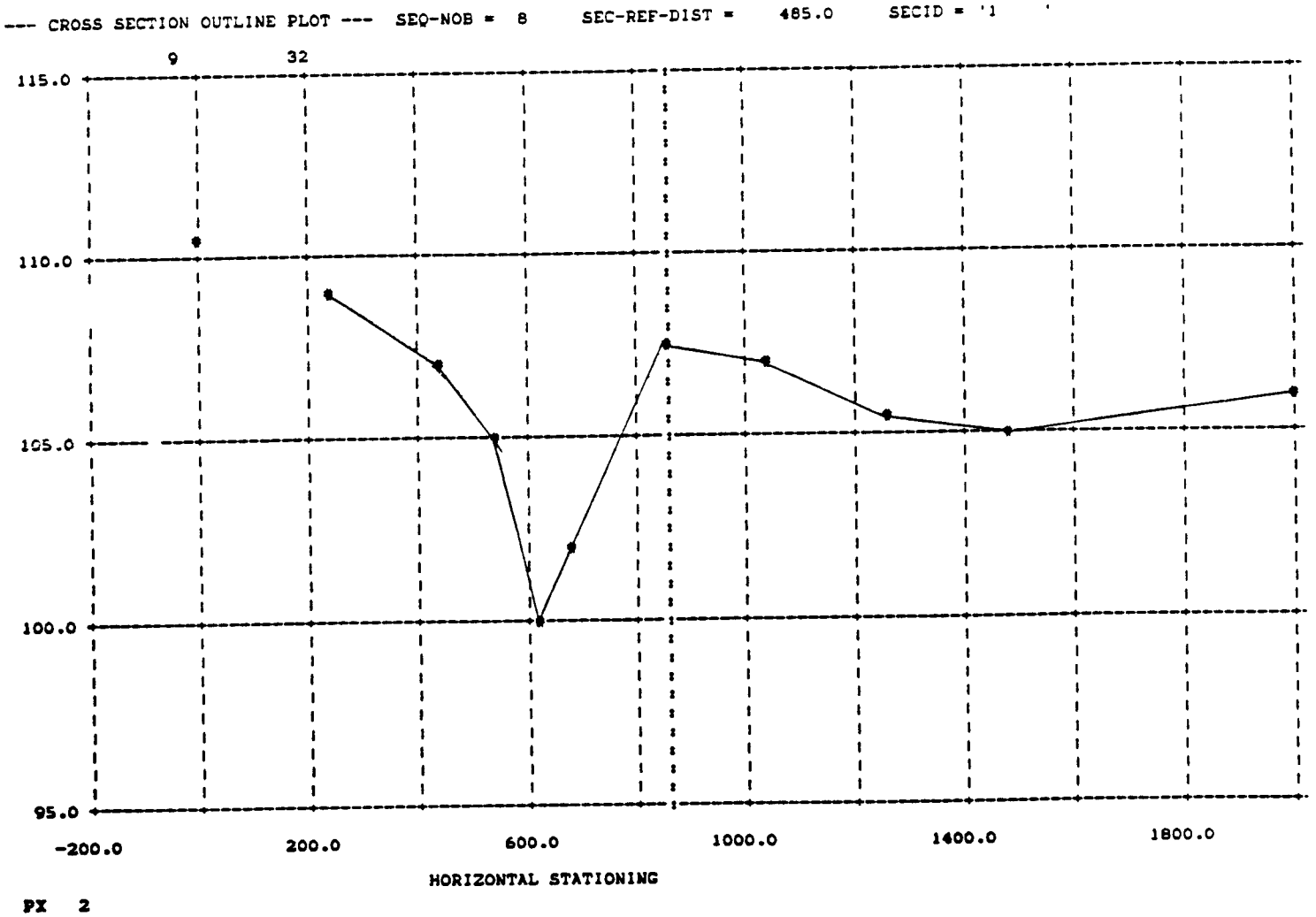
--- CROSS SECTION OUTLINE PLOT --- SEQ-NOB = 1 SEC-REF-DIST = 3300.0 SECID = 'B



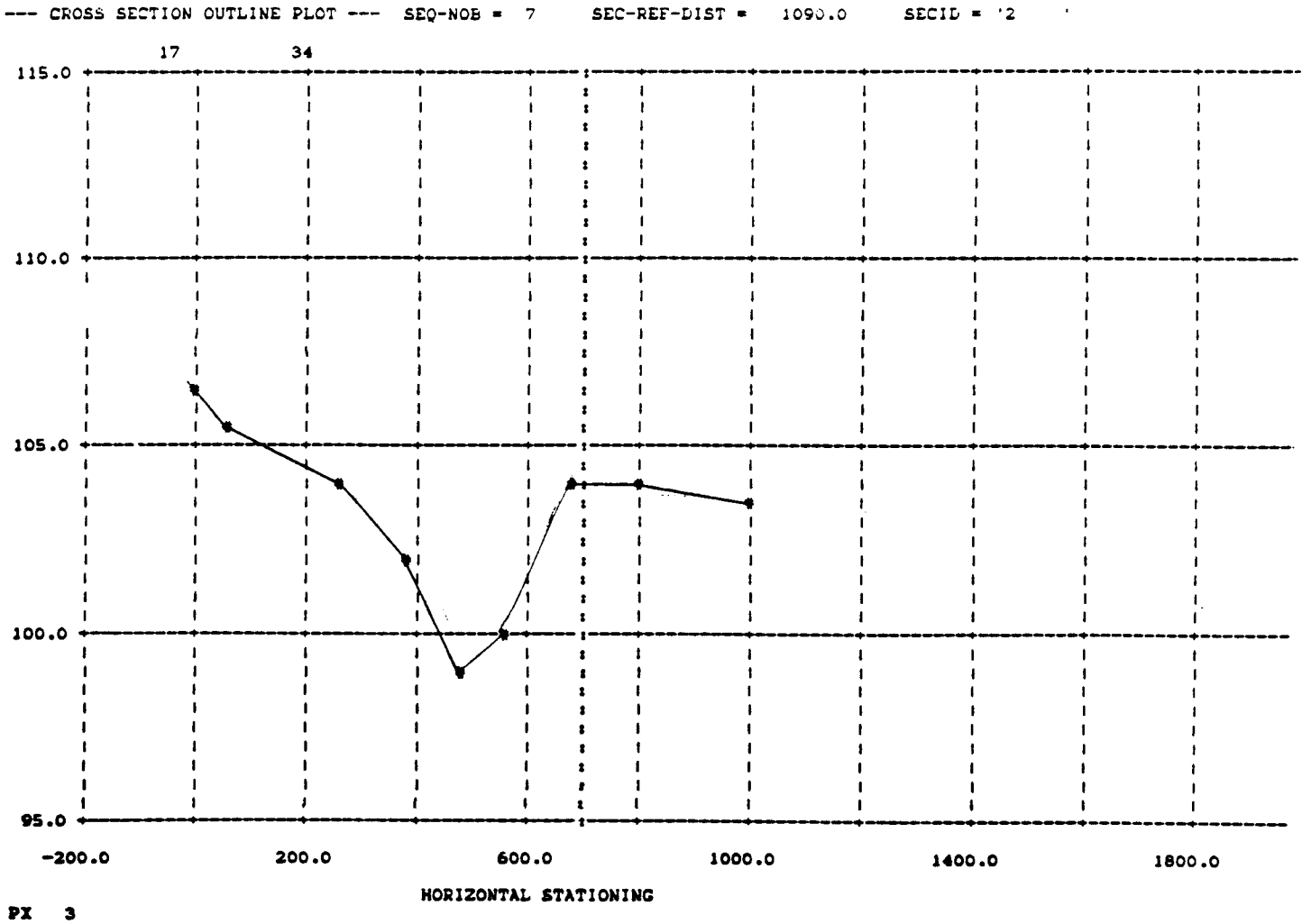
EX 1

+++ BEGINNING PROFILE CALCULATIONS -- 1

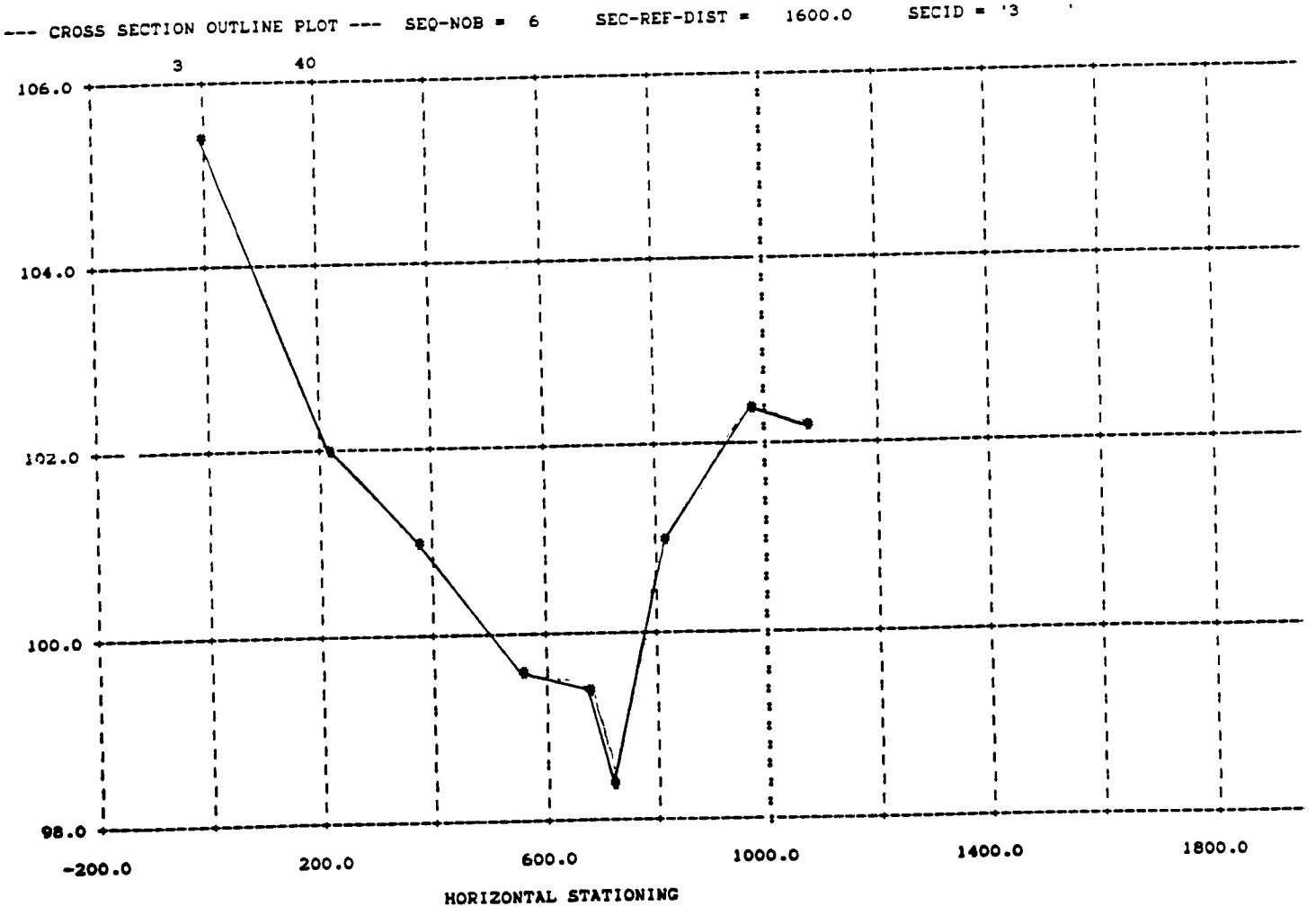
unnamed arroyo - Melrose Air Force Range



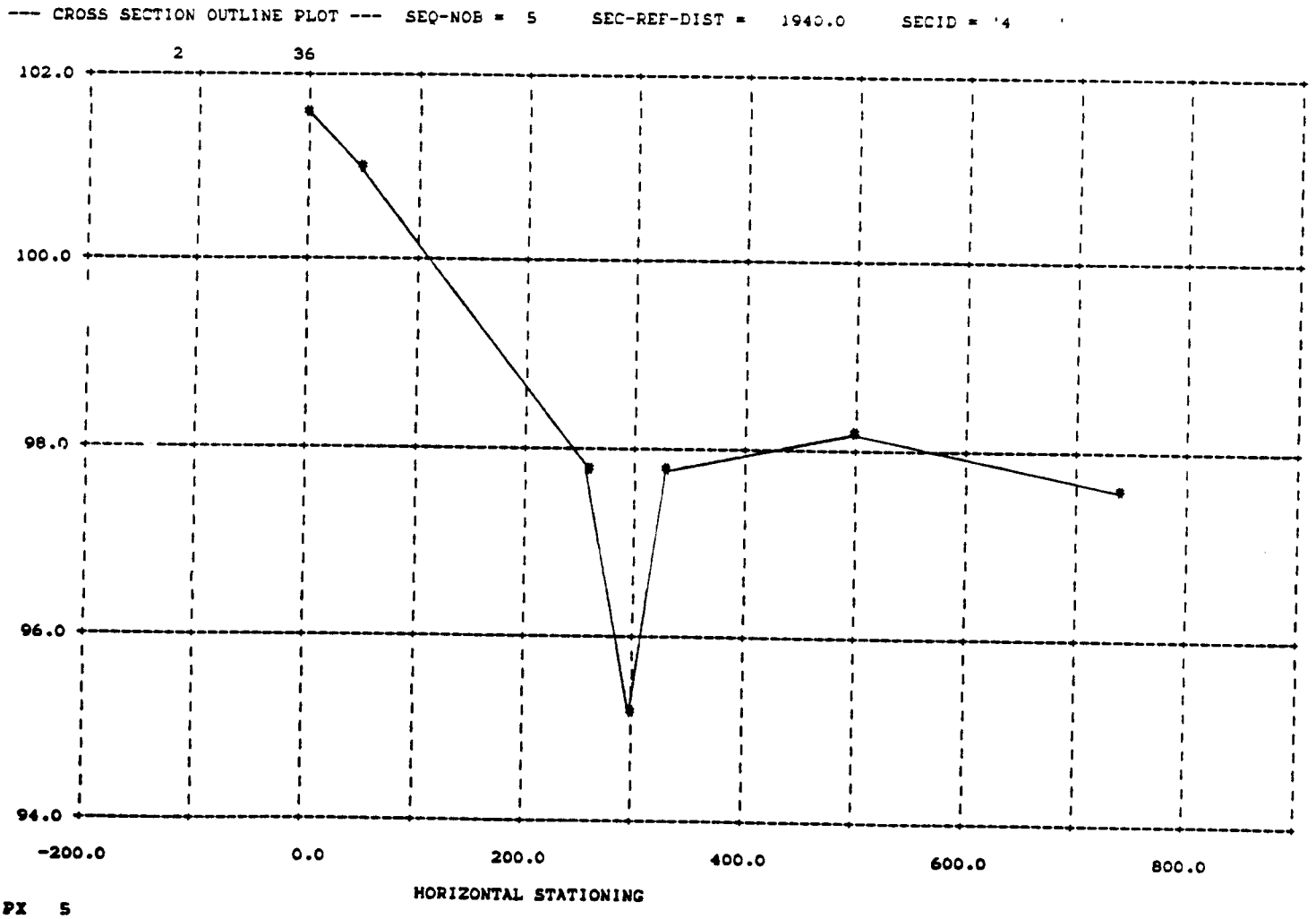
unnamed Arroyo - Melrose Air Force Range



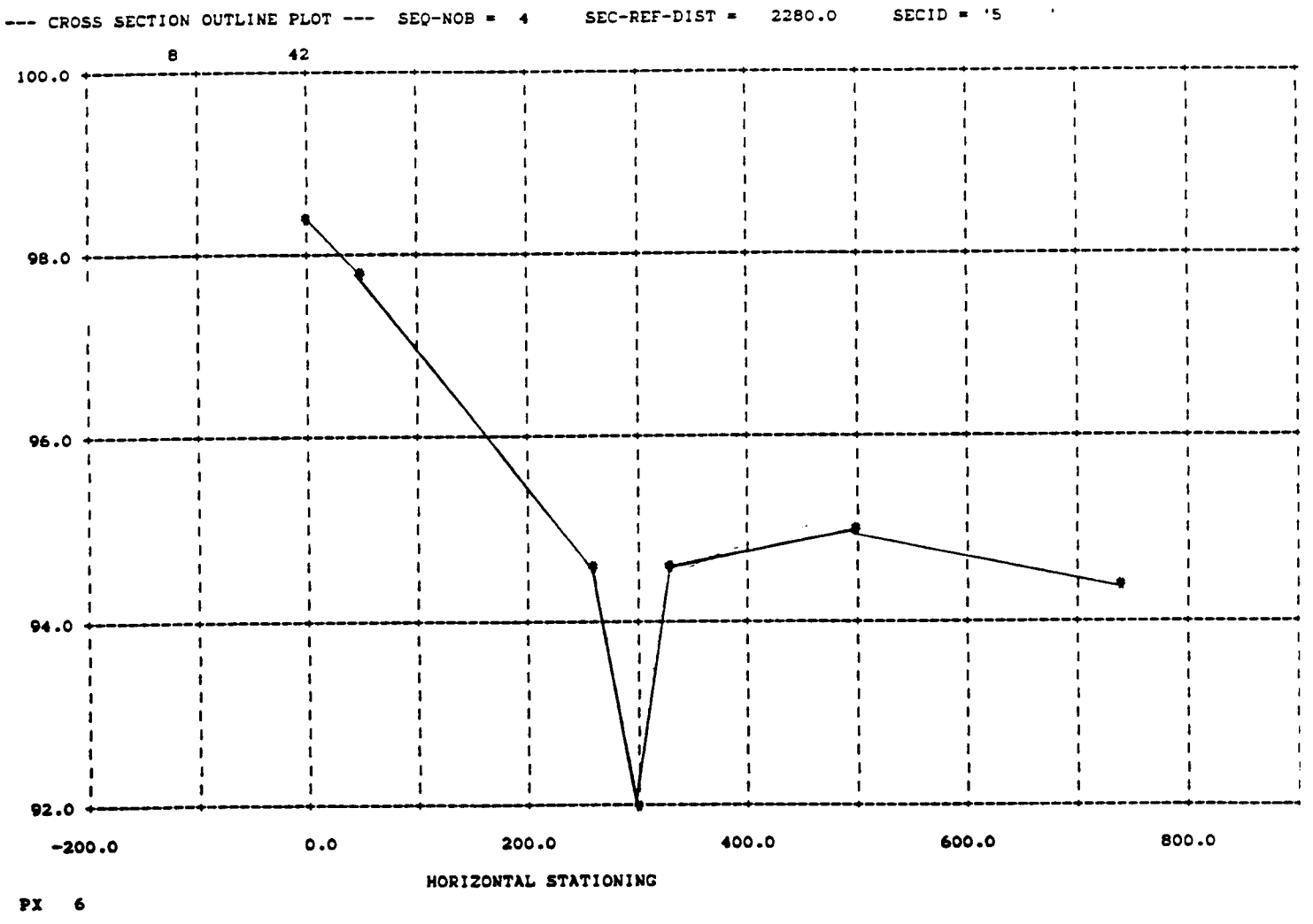
unnamed arroyo - Melrose Air Force Range



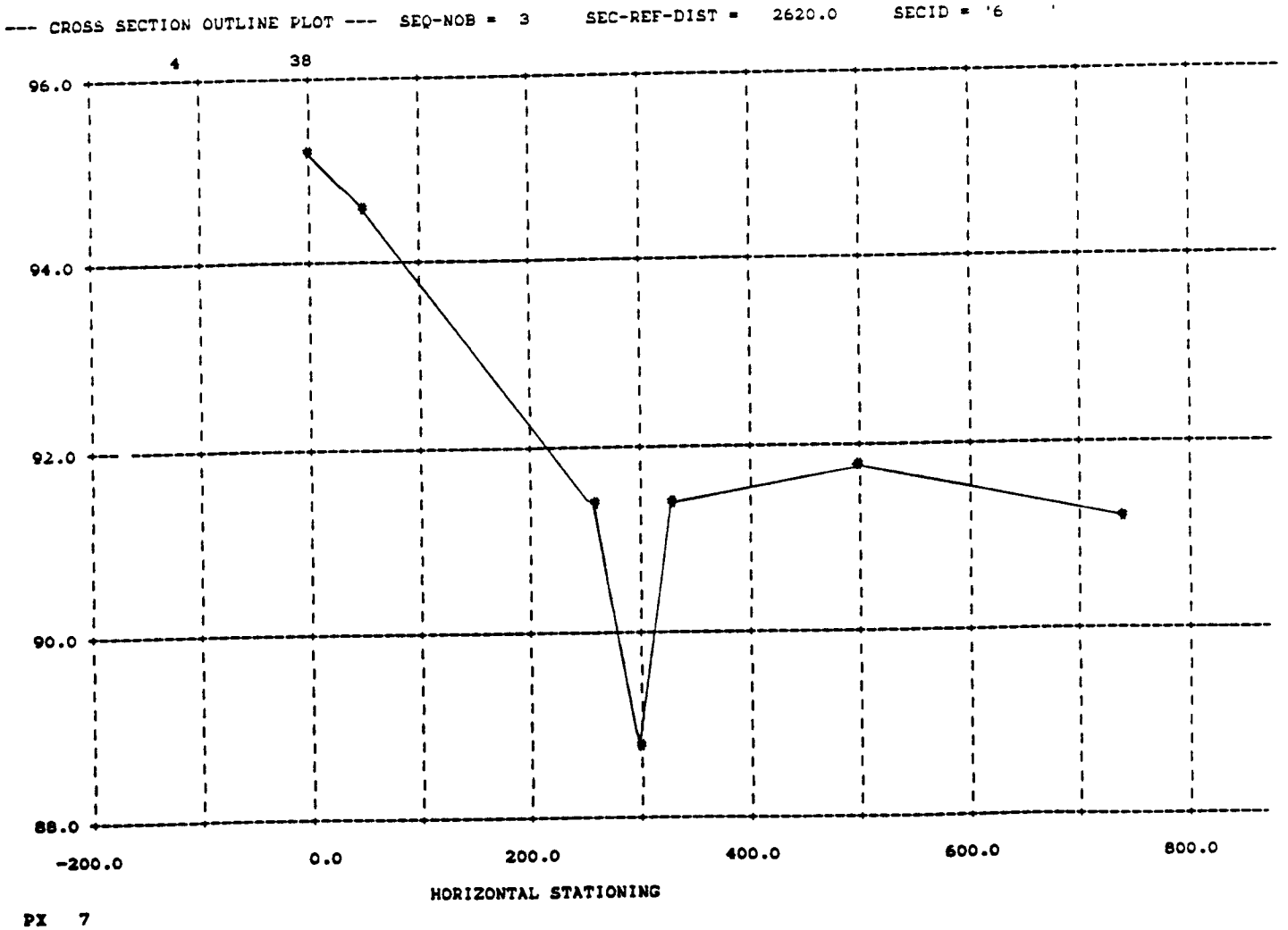
Unnamed arroyo – Melrose Air Force Range



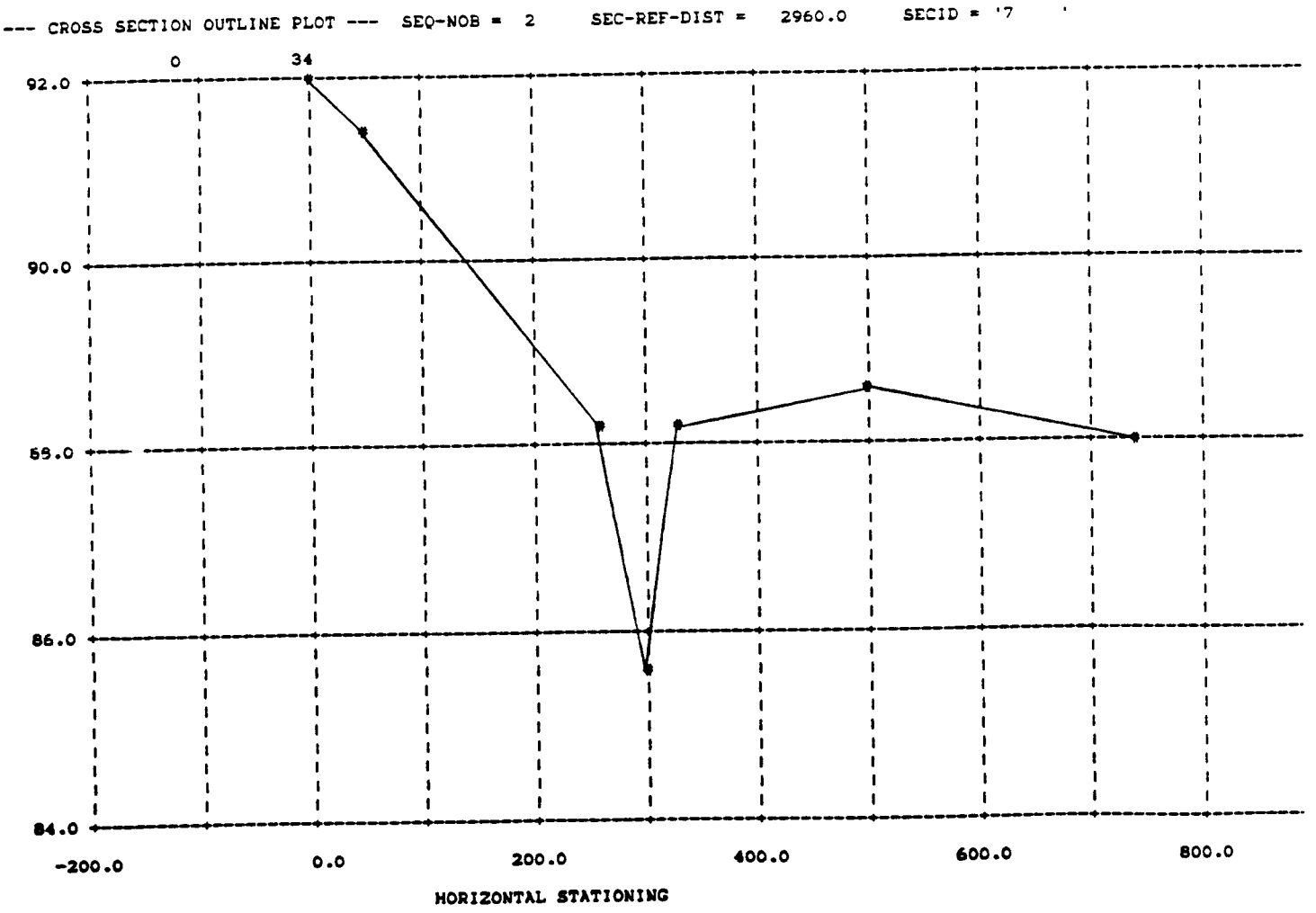
Unnamed arroyo - Melrose Air Force Range



unnamed arroyo - Melrose Air Force Range



Unnamed arroyo – Melrose Air Force Range



PX 8

```
WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
V060188             MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

         UNNAMED ARROYO (MELROSE BOMBING RANGE)
            *** RUN DATE & TIME: 01-29-93  13:03

 ===015 WSI IN WRONG FLOW REGIME AT SECID "1     ":  USED WSI = CRWS.
                                WSI,CRWS =   105.81      105.25

 XSID:CODE    SRDL      LEW       AREA     VHD      HF       EGL      CRWS         Q      WSEL
       SRD    FLEN      REW          K   ALPH      HO       ERR       FR#       VEL

1     :XS    ******    528.       749.   0.97 *****  106.23   105.25    5550.   105.25
       485.  ******   1650.     88764.   1.14 ***** *******     1.19     7.41

 ===110 WSEL NOT FOUND AT SECID "2     ":  REDUCED DELTAY.
                     WSLIM1,WSLIM2,DELTAY =   102.98       99.10    -0.02

 ===130 CRITICAL WATER-SURFACE ELEVATION  A _ S _ S _ U _ M _ E _ D  !!!!!
                ENERGY EQUATION  N_O_T  B_A_L_A_N_C_E_D  AT SECID "2     "
                     WSBEG,WSEND,CRWS =   102.98       99.10      102.98

2     :XS       605.   326.       692.   1.00 *****  103.99   102.98    5550.   102.98
      1090.     605.   657.     76647.   1.00 ***** *******     0.98     8.02

 ===110 WSEL NOT FOUND AT SECID "3     ":  REDUCED DELTAY.
                     WSLIM1,WSLIM2,DELTAY =   101.68       98.60    -0.02

 ===130 CRITICAL WATER-SURFACE ELEVATION  A _ S _ S _ U _ M _ E _ D  !!!!!
                ENERGY EQUATION  N_O_T  B_A_L_A_N_C_E_D  AT SECID "3     "
                     WSBEG,WSEND,CRWS =   101.68       98.60      101.68

3     :XS       510.   293.       840.   0.68 *****  102.36   101.68    5550.   101.68
      1600.     510.   890.     71450.   1.00 ***** *******     0.98     6.61

 ===140 AT SECID "4     ":  END OF CROSS SECTION EXTENDED VERTICALLY.
                                WSEL,YLT,YRT =    99.26      101.60       97.60

4     :XS       340.   172.       777.   0.79   2.27   100.05    99.31    5550.    99.26
      1940.     340.   743.     64482.   1.00   0.00     0.03     1.08     7.14

 ===140 AT SECID "5     ":  END OF CROSS SECTION EXTENDED VERTICALLY.
                                WSEL,YLT,YRT =    95.88       98.40       94.40

5     :XS       340.   184.       677.   1.04   3.12    96.93    96.11    5550.    95.88
      2280.     340.   743.     52023.   1.00   0.00     0.00     1.31     8.19

 ===140 AT SECID "6     ":  END OF CROSS SECTION EXTENDED VERTICALLY.
                                WSEL,YLT,YRT =    92.86       95.20       91.20

6     :XS       340.   172.       777.   0.79   3.12    93.65    92.91    5550.    92.86
      2620.     340.   743.     64482.   1.00   0.13     0.03     1.08     7.14

 ===140 AT SECID "7     ":  END OF CROSS SECTION EXTENDED VERTICALLY.
                                WSEL,YLT,YRT =    89.48       92.00       88.00

7     :XS       340.   184.       677.   1.04   3.12    90.53    89.71    5550.    89.48
      2960.     340.   743.     52023.   1.00   0.00     0.00     1.31     8.19

 ===140 AT SECID "8     ":  END OF CROSS SECTION EXTENDED VERTICALLY.
                                WSEL,YLT,YRT =    86.46       88.80       84.80
```

WSPRO
V060188

FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
MODEL FOR WATER-SURFACE PROFILE COMPUTATIONS

UNNAMED ARROYO (MELROSE BOMBING RANGE)
*** RUN DATE & TIME: 01-29-93 13:03

FIRST USER DEFINED TABLE.

XSID	CODE	WSEL	YMIN	SKEW	SRD	K	AREA	Q	XSTW	XSWP	LEW	REW	FR#	CRWS
8	XS	86.46	82.40	0.	3300.	64482.	777.	5550.	571.	573.	172.	743.	1.08	86.51
7	XS	89.48	85.60	0.	2960.	52023.	677.	5550.	559.	561.	184.	743.	1.31	89.71
6	XS	92.86	88.80	0.	2620.	64482.	777.	5550.	571.	573.	172.	743.	1.08	92.91
5	XS	95.88	92.00	0.	2280.	52023.	677.	5550.	559.	561.	184.	743.	1.31	96.11
4	XS	99.26	95.20	0.	1940.	64482.	777.	5550.	571.	573.	172.	743.	1.08	99.31
3	XS	101.68	98.40	0.	1600.	71450.	840.	5550.	597.	597.	293.	890.	0.98	101.68
2	XS	102.98	98.90	0.	1090.	76647.	692.	5550.	331.	331.	326.	657.	0.98	102.98
1	XS	105.25	99.90	0.	485.	88764.	749.	5550.	549.	549.	528.	1650.	1.19	105.25

ER

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. | Washington ..... | District .....

Unnamed Arroyo – Melrose Air Force Range

Section 1			Section 2			Section 3			Section 4		
STA	ELEV		STA	Elev		STA	ELEV		STA	Elev	
0	110.6		0	106.4		0	105.4		0	101.6	
243	109.2		67	105.7		230	102.1		50	101.1	
448	106.5		257	104.1		380	101.1		262	97.9	
536	105.1		387	102.0		556	99.7		296	95.2	←
613	95.5	←	482	98.9	←	672	99.5		334	97.8	
673	101.8		552	99.8		723	98.4	←	503	98.3	
864	107.3		690	124.0		821	101.1		743	97.6	
1036	107.0		803	103.9		975	102.4				
1252	105.7		1009	103.4		1084	102.3				
1482	104.8					1347	100.3				

Section 5			Section 6			Station 7			Section 8		
STA	Elev		STA	Elev		STA	Elev		STA	Elev	
0	83.4		0	90.7		0	79.6		0	77.6	
442	87.3		142	89.9		175	79.3		230	70.4	
927	89.6		316	88.2		262	79.4		488	69.2	
1199	91.6		324	87.0	←	411	77.4		686	68.2	
1312	101.6		332	88.3		567	78.9		848	67.7	
1444	92.6		355	88.4		745	79.2		1031	67.9	
1549	92.5	←	500	88.8		816	79.0		1134	68.6	
1672	92.6					830	77.8	←	1304	68.2	
1653	91.3					842	79.0		1491	67.8	
1788	92.9					1158	79.1		1710	68.3	
2692	93.3					1544	78.7		1907	67.8	
			Min	FALL	SRD	1801	78.0		2115	67.6	←
		1	99.9	0	485						
		2	98.9	1.0	1090				2357	68.0	
		3	98.4	0.5	1600				2599	66.8	
		4	95.2	3.2	1940				2804	67.0	
		5	92.5	2.7	3090				2986	66.9	
		6	87.0	5.5	3540						
		7	77.8	9.2	4210						
		8	67.6	10.2	5430						

U.S. GOVERNMENT PRINTING OFFICE: 1985—O-763-750 857-606

EDM FIELD NOTES FOR INDIRECT DISCHARGE MEASUREMENT

Site: Unnamed Arroyo - Melrose Air Force Range

Flood date: _____

Survey Party: Phillips & Waltemeyer ?? Survey Date: 1-25-98

Instrument no.: _____ Date of two peg test: _____

Weather: _____

Hub 1 @ _____

Elevation of Hub: 92.18

Measure-up: 4.70

HI = 96.88

HI computation

100	+	8.30 - 5.18 +	_____	= 96.88
_____	+	_____ +	_____	= _____
_____	+	_____ +	_____	= _____

low rod = 5.18 high rod = 8.83

Station	Azimuth Degree	Min	Sec	Distance (at hub 1)	Rod	Elev	Remarks
RP 1	190	02	55	1592	+8.30	100.00	-assumed
hub 2	246	46	45	644	+6.73	98.43	
	A Section						section parallel rod with towers
1.00	351	42	40	1625	-8.27	83.43	
442	350	58	50	1183	-4.44	87.26	
485	350	53	00	698	-2.06	89.64	
272	350	14	25	426	-.09	91.61	
113	349	26	35	314	+.49	101.57	
132	348	11	45	182	+.91	92.61	
105	347	13	40	77	+.79	92.49	
73	346	32	25	55	+.95	92.65	
31	343	08	45	23	-.33	91.31	
135	160	28	55	111	+1.24	92.94	
904	167	24	10	1014	+1.60	93.30	
R							
	B Section						Proceeding downstream
R 0	58	14	00	452	-2.87	88.83	
145	39	29	55	426	-3.32	88.38	
23	36	38	45	418	-3.44	88.26	
8	35	30	40	420	-4.68	87.02	
9	34	26	00	419	-3.47	88.23	
174	10	56	10	434	-1.71	89.99	
L 142	354	15	15	485	-1.00	90.70	
	C SECTION						
L	18	21	55	1407	-12.11	79.59	
175	75	24	45	1370	-12.39	79.31	
87	29	02	00	1361	-12.35	79.35	

Sheet 1 of ___ sheets computed: SDW checked: rot88NM

EDM FIELD NOTES FOR INDIRECT DISCHARGE MEASUREMENT

Site: Unnamed Arroyo - Melrose Air Force Range

Flood date: _____

Survey Party: _____ Survey Date: 1-25-93

Instrument no.: _____ Date of two peg test: _____

Weather: _____

Hub 3 @ _____

Elevation of Hub: _____

Measure-up: ③ 5.02

HI = 96.88

HI computation

_____ + _____ + _____ = _____

_____ + _____ + _____ = _____

_____ + _____ + _____ = _____

low rod = _____ high rod = _____

Station	Azimuth Degree	Min	Sec	Distance	Rod	Elev	Remarks
149	29	39	00	1360	-14.33	77.37	
156	30	18	50	1358	-12.77	78.93	
178	37	50	25	1332	-12.49	79.21	
71	40	30	55	1341	-12.65	79.05	
14	41	26	25	1342	-13.93	77.77	
12	41	36	55	1343	-12.69	79.01	
316	55	14	15	1375	-12.60	79.10	
386	65	33	00	1516	-13.04	78.66	
R 257	77	41	20	1642	-13.65	78.05	
⊡3	44	13	55	1501	-13.21	78.49	10' NE of Fence outside range
	↗ @ ⊡3			HI = 83.56			HI = 92.18 + (-8.54) = 83.64
⊡1	224	13	55	1501	+13.72	92.10	HI = 78.49 + 5.02 = 83.51
	D SECTION						
L 0	330	33	05	1411	-5.82	77.56	
230	339	48	20	1354	-7.94	70.44	
258	349	40	20	1220	-9.14	69.24	
198	358	13	10	1127	-10.19	68.19	
162	6	12	30	1074	-10.68	67.70	
183	15	39	50	1012	-10.50	67.88	
103	21	19	25	980	-9.26	68.62	
170	31	17	50	970	-10.16	68.22	
187	42	16	30	990	-10.52	67.86	
219	54	07	45	1051	-10.11	68.27	
197	63	22	30	1139	-10.57	67.81	
208	71	21	00	1263	-10.81	67.57	
242	79	46	00	1406	-10.36	68.02	
242	86	09	00	1583	-11.55	66.79	

Sheet 2 of ___ sheets computed: SDW checked: _____ mrBBNM

EDM FIELD NOTES FOR INDIRECT DISCHARGE MEASUREMENT

Site: Unnamed Arroyo - Melrose Air Force Range
Flood date: _____

Survey Party: _____ Survey Date: 1-25-26-93
Instrument no.: _____ Date of two peg test: _____
Weather: _____

Hub _____ @ _____
Elevation of Hub: _____
Measure-up: _____

From page 2
HI = 83.56

HI computation

100.00	+ 3.86 + 5.18 +		=	109.04
	+		=	
	+		=	

low rod = 5.18 high rod = 8.83

Station	Azimuth Degree	Min	Sec	Distance	Rod	Elev	Remarks
205	90	11	05	1751	-11.33	67.05	
182	83	29	40	1898	-11.51	66.87	
RO							
⊡4	17	30	45	1486	-14.01	64.37	
	01-26-93				① HI	109.04	
RP1	84	28	30	744	-7.86	100.00	Given
⊡2	19	04	35	1479	-5.45	98.41	by yellow truck
	E SECTION						
LO	272	42	00	1390	+6.74	110.60	
243	273	17	40	1167	+5.38	109.24	
205	268	45	10	980	+3.00	106.86	
88	266	50	00	898	+1.24	105.10	
77	264	13	05	831	-.32	99.89	
60	264	05	30	771	+1.63	101.84	
191	256	02	20	606	+3.47	107.33	Norm L
172	244	09	20	475	+3.13	106.99	
216	223	42	55	307	+1.85	105.71	
230	175	23	00	216	+0.94	104.80	
R							
	F SECTION						
RO	26	21	05	33	-0.42	103.44	
206	319	20	40	217	+.06	103.92	
113	319	03	15	330	+.18	104.04	
138	315	57	00	466	-4.04	99.82	
70	315	24	30	536	-4.92	98.94	
95	315	45	35	631	-1.82	102.04	
130	316	02	35	760	~~+0.28~~ +0.28	104.14	

Sheet 3 of _____ sheets computed: SDW checked: _____

USGS FIELD NOTES FOR INDIRECT DISCHARGE MEASUREMENT

Site: Unnamed arroyo - Melrose Air Force Range

Flood date: _____

Survey Party: _____ Survey Date: 1-26-93

Instrument no.: _____ Date of two peg test: _____

Weather: _____

Hub _____ @ _____

Elevation of Hub: _____

Measure-up: _____

HI = 109.04

HI computation

_____ + _____ + _____ = _____

_____ + _____ + _____ = _____

_____ + _____ + _____ = _____

low rod = 5.18 high rod = 8.83 41

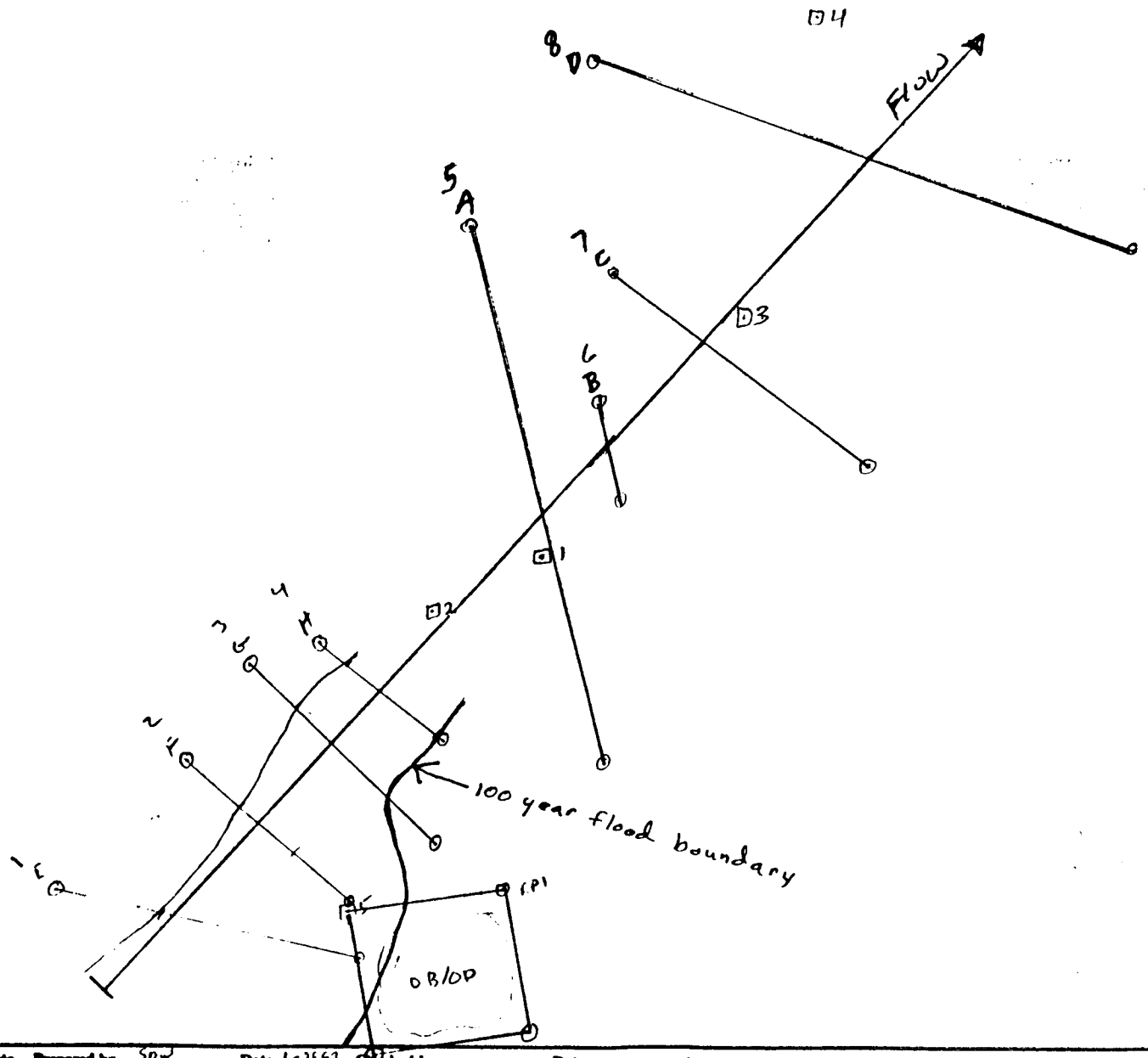
Station	Azimuth Degree	Min	Sec	Distance	Rod	Elev	Remarks
190	315	15	30	950	+1.87	105.73	
67	315	19	45	1017	+2.52	106.38	
L							
		G	SECTION				
LO	342	01	05	1266	+1.54	105.40	
230	346	58	55	1059	-1.72	102.14	
150	348	16	05	910	-2.72	101.14	
176	350	47	30	739	-4.15	99.71	
116	353	01	30	626	-4.35	99.51	
51	353	44	35	575	-5.50	98.36	
98	356	46	40	482	-2.76	101.10	
154	11	25	15	371	-1.51	102.35	
109	28	22	20	342	-1.53	102.33	
R 263	56	56	55	506	-3.60	100.26	
		H	SECTION				
RO	32	38	55	912	-6.31	97.55	
240	18	23	25	970	-5.55	98.31	
169	9	21	20	1037	-6.00	97.86	
38	7	51	00	1058	-8.69	95.17	
34	6	36	00	1083	-5.94	97.92	
212	358	59	10	1230	-2.74	101.12	
LO 50	357	29	10	1267	-2.21	101.65	
P.T NW	200	35	40	10	-.03	103.83	
P.T 700	174	20	20	709	+1.07	104.93	
P.T 249	127	42	45	1030	-5.05	98.81	
RPI 706	84	28	30	743	-3.91	99.95	

Sheet 4 of ___ sheets computed: SDW checked: rpt88NM

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

UNNAMED ARROYO (MELROSE BARREL RANCH)



Section	SRD - feet
1	485
2	1090
3	1600
4	1940
5	3090
6	3540
7	4210
8	5430

Sheet No. 1 of 1 Sheets Prepared by SPJ Date 1-28-93 Checked by ..... Date .....

FOLD

Map showing unnamed Arroyo on Melrose Air Force Range

MELROSE AIR FORCE RANGE

BASELINE CHARACTERIZATION SAMPLING AND ANALYSIS PLAN

PREPARED BY:

27 CES/CEV
CANNON AFB, NM
22 Feb 94

1. INTRODUCTION

The purpose of this sampling and analysis plan (SAP) is to provide baseline site characterization data for the Melrose Air Force Range (MAFR) Open Detonation (OD) Unit to compliment the data gathered from previous studies. The baseline data will be used to support the Resource Conservation and Recovery Act (RCRA) Subpart X Permit Application for MAFR, an ancillary part of Cannon Air Force Base (CAFB), New Mexico. Environmental baseline data is necessary to determine if previous demilitarization activities at the OD area have affected ambient soils and to identify contaminated areas for further study and/or remedial action.

This plan explains the rationale for how and why samples are collected and explains the spatial relationships for sample collection. This plan is based upon historical knowledge of MAFR operations, United States Air Force (USAF) OD operations, existing environmental conditions, previous studies conducted to determine contamination of OD units ("Bang Box" studies by Johnson, 1991 & 1993, and USGS Baseline Study 1993). Where applicable, the procedures and quality assurance/quality control (QA/QC) techniques in EPA's November 1986 *Test Methods for Evaluating Solid Waste* have been used to prepare this SAP.

2. SITE DESCRIPTION

The OD unit is within the boundaries of MAFR in Roosevelt County, New Mexico, approximately 25 miles southwest of Cannon AFB. The location of MAFR and the exact location of the OD unit are shown in Section B of the Part B permit application. The area within which the OD unit is located consists of a 700-ft circular area which is regularly cleared of vegetation and debris. Encircling this cleared area is an earthen berm used to prevent run-on and run-off of storm water. The environmental conditions, including geology, hydrogeology, topography and drainage features, and climate at MAFR are described in Section B of the Part B RCRA permit application.

3. SAMPLING APPROACH AND RATIONALE

3.1 RATIONALE

Melrose AFR has never been used for the research and development of nuclear, chemical warfare, or other exotic warfare type weapons. The only munitions delivered or disposed of at MAFR have been conventional live and training munitions. Therefore, the emphasis of the sampling and analysis should search only for those constituents present in these wastes. This philosophy supports the analytical methods described in Section 3.3 and Table 4. Any further investigations should be addressed during closure of the unit and only if appropriate at that time. This is also supported by studies conducted on OD units to determine contamination and air toxic release often referred to as the "Bang Box" studies (Johnson 1991 & 1993).

Previous OD operations were conducted using 10-12 feet wide trenches dug to a depth of 6-8 feet. Munitions were then detonated in these trenches. After the detonation trench was cleared of scrap metal, the trenches were backfilled. Earlier baseline studies adequately addressed surface soil contamination, but did not properly address the potential contamination located at a depth consistent with old trenches. Research information indicates all of the previous OD trenches were constructed within 50 feet of the center of the OD unit. Therefore, the primary focus of this study is to search for contamination at a depth of 6-15 feet within 50 feet of the center of the OD unit.

The number of boreholes is based upon the Remedial Action Cost Engineering and Requirements (RACER) System calculations using the site

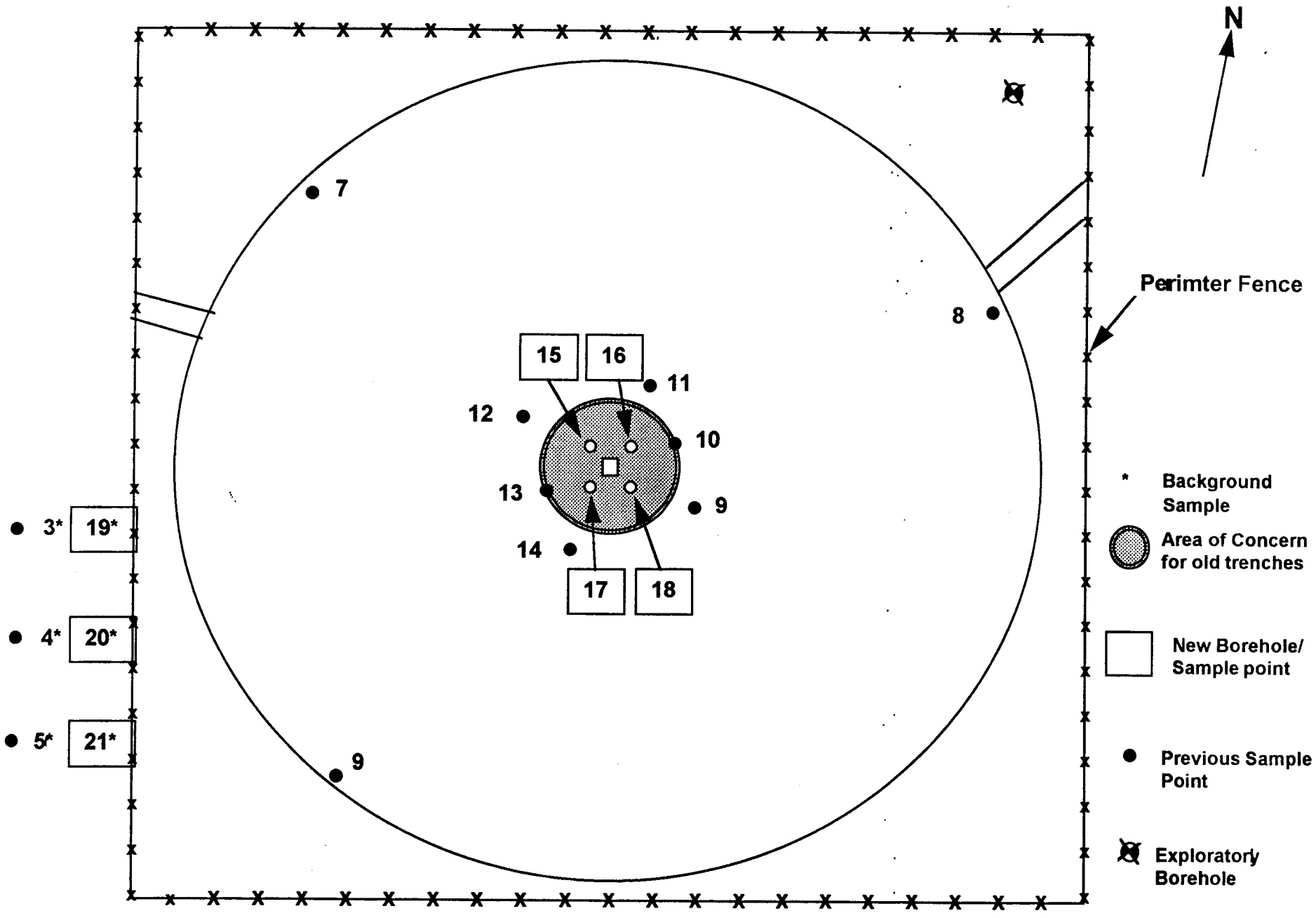


Figure 1 Baseline Characterization Sample Locations

^Denotes Previous Background samples
*Denotes Samples from this Round of Sampling

Table 1
VERTICAL SAMPLE LOCATIONS

BOREHOLE NUMBER	SAMPLE NUMBER	DEPTH	CORRESPONDING USGS NUMBER	REMARKS
1	1	0-1'	OB/OD0101	
1	2	5'	OB/OD0102	
1	3	10'	OB/OD0103	
2		0-1'	OB/OD0201	
2		5'	OB/OD0202	
2		5'	OB/OD0203	
2		10'	OB/OD0204	
3^		0-1'	OB/OD0301	Previous Background Sample
3^		5'	OB/OD0302	Previous Background Sample
3^		10'	OBOD0303	Previous Background Sample
4^		0-1'	OB/OD0401	Previous Background Sample
4^		5'	OB/OD0402	Previous Background Sample
5^		0-1'	OB/OD0501	Previous Background Sample
5^		5'	OB/OD0502	Previous Background Sample
6		0-1'	OB/OD0601	
6		5'	OB/OD0602	
7		0-1'	OB/OD0701	
7		5'	OB/OD0702	
8		0-1'	OB/OD0801	
8		0-1'	OB/OD0802	
8		5'	OB/OD0803	
9		0-1'	OB/OD0901	
9		5'	OB/OD0902	
10		0-1'	OB/OD1001	
10		5'	OB/OD1002	
11		0-1'	OB/OD1101	
11		5'	OB/OD1102	
12		0-1'	OB/OD1201	
12		5'	OB/OD1202	
13		0-1'	OB/OD1301	
13		5'	OB/OD1302	
14		0-1'	OB/OD1401	
14		5'	OB/OD1402	
15*		0-1'		
15*		5'		
15*		10'		
15*		15'		
16*		0-1'		
16*		5'		
16*		10'		
16*		15'		
17*		0-1'		
17*		5'		
17*		10'		
17*		15'		
18*		0-1'		
18*		5'		
18*		10'		
18*		15'		
19*		15'		Additional Background Sample
20*		10'		Additional Background Sample
20*		15'		Additional Background Sample
21*		10'		Additional Background Sample
21*		15'		Additional Background Sample

^Denotes Previous Background Sample
*Denotes Sample from this Round of Sampling

specific conditions and potential contaminants. RACER is the standard for USAF and US Army Corps of Engineers in determining site characterization parameters. A description of the baseline RACER parameters used to establish this study are contained in Appendix 1 to this plan. The RACER calculations were based upon investigating the entire fenced area (approximately 12 acres) of the OD facility. The RACER estimate requirements to characterize the entire area of the OD facility were 5 subsurface soil boreholes, and 4 surface soil samples. The primary focus of this additional baseline characterization is to search the old trench area (only the 50 radius circle around center of OD unit). This is the basis for downward adjustment of sample numbers from 5 boreholes to 4 boreholes.

Four additional subsurface borings (Boreholes #15-#18) are to be studied under this SAP. All of the borings are located within 50 feet of the center of the OD unit. Samples will be collected at 0, 5, 10, and 15 ft intervals. Additional background samples (Borehole #19-#21) will be taken near the previous background locations. Background samples will collected at depths to compliment previous samples (i.e. deeper than in the previous study). Background sampling will be conducted at a distance sufficiently separate from previous OD activities such that contamination at the sampling locations will not have occurred. Table 1 summarizes vertical locations of all samples. Boring locations for the additional borings are indicated by a box in Figure 1.

3.2 INTEGRATION WITH PREVIOUS STUDIES

Vertical and horizontal sample locations from previous baseline surveys are located in Figure 1 with analytical results summarized in Tables 2 and 3. Upon review of the 1993 USGS Baseline Study, NMED found the study did not properly address potential contamination associated with the old OD trenches. Therefore, this additional baseline study will be used to compliment existing data.

The previous study consisted of 33 samples, of which, 7 were for background. These samples were analyzed for RCRA metals (EPA Method 6010) and explosives (EPA Method 8330). The samples were located as depicted in Figure 1 (horizontal locations) and Table 1 (vertical locations). This sampling plan will compliment the previous study by further examining for contamination associated with old OD trenches and by providing additional sample locations, additional analytes, better QA/QC, and additional background sampling.

Together, the proposed and previous studies will allow a complete evaluation of existing contamination at the OD facility. Should any new information/contamination be detected in this episode of baseline characterization, additional sampling may be warranted.

Table 2
Previous Study Sample Results
METALS
(PPM)

BOREHOLE #	DEPTH OF SAMPLE	Antimony	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Molybdenum	NICKEL	Potasium	Selenium	Solver	Sodium	Tallium	Vanadium	Zinc
1	0-1'	ND	10300	ND	113	0.6	ND	41100	8.3	ND	7.4	8790	ND	2440	149	ND	9.5	1920	ND	ND	ND	ND	21.4	20.9
1	5'	ND	5330	ND	90	0.34	ND	37900	5.2	ND	ND	5580	ND	2600	127	ND	5.7	1050	ND	ND	ND	ND	17.1	12.8
1	10	ND	6970	ND	418	0.47	ND	119000	5	ND	4.6	6300	ND	3210	104	ND	21.8	1510	ND	ND	ND	ND	20.5	16
2	0-1'	ND	9620	ND	127	0.56	ND	48300	7.5	ND	6.7	8390	ND	2380	154	ND	9.4	1810	ND	ND	ND	ND	20.4	20.6
2	5'	ND	7420	ND	120	0.54	ND	47600	6.3	ND	7.3	7010	ND	2070	142	ND	8.7	1460	ND	ND	ND	ND	19.2	17.9
2	5'	ND	4280	ND	561	ND	ND	115000	ND	ND	4.1	4770	ND	2290	749	ND	ND	ND	ND	ND	ND	ND	18.3	11.9
2	10'	ND	5320	ND	415	ND	ND	220000	ND	ND	ND	5060	ND	3060	193	ND	24	ND	ND	ND	ND	ND	17.6	14.3
3	0-1'	ND	5830	ND	91.2	0.49	ND	8700	6.2	ND	5.8	6690	ND	1870	214	ND	7.9	1590	ND	ND	ND	ND	13.1	18.9
3	5'	ND	5420	ND	48.2	0.35	ND	48500	5.1	ND	3.3	5940	ND	2670	131	ND	6.6	1190	ND	ND	ND	ND	16.2	13.2
3	10'	ND	8960	ND	105	0.55	ND	67300	7.5	4.1	6.1	8570	ND	4530	201	ND	9.4	2020	ND	ND	ND	ND	26.6	22.3
4	0-1'	ND	9610	ND	98.8	0.64	ND	4110	8.7	4.2	8.4	8430	ND	2150	229	ND	10.4	2130	ND	ND	ND	ND	17.3	21.8
4	5'	ND	7080	ND	112	0.47	ND	57300	5.7	ND	6.3	6600	ND	3450	185	ND	8	1520	ND	ND	ND	ND	27.4	17.9
5	0-1'	ND	9550	ND	94.7	0.62	ND	3030	9.1	4.3	8.4	8650	ND	1870	225	ND	9.6	1920	ND	ND	ND	ND	18.2	20
5	5'	ND	5080	ND	176	0.35	ND	56700	4.2	ND	4.4	4710	ND	2630	143	ND	7.1	1100	ND	ND	ND	ND	16.1	13
6	0-1'	ND	10900	ND	119	0.69	ND	7830	10.1	5.1	8.5	9770	ND	2350	249	ND	11.4	2230	ND	ND	ND	ND	20.5	23.5
6	5'	ND	7160	ND	127	ND	ND	97100	4.9	ND	4.5	5900	ND	3140	122	ND	8	1640	ND	ND	ND	ND	18.6	31.1
7	0-1'	ND	9150	ND	110	0.6	ND	33600	7.3	4.3	8.5	7070	ND	1990	156	ND	9.8	1640	ND	ND	ND	ND	20.1	18.3
7	5'	ND	10100	ND	146	0.67	ND	46500	7.8	4.5	9	8100	ND	2560	193	ND	11.2	2090	ND	ND	ND	ND	24.2	21.5
8	0-1'	ND	9800	ND	117	0.62	ND	29100	7.8	4.1	8.7	7900	ND	2130	171	ND	9.8	1720	ND	ND	ND	ND	20.9	23.7
8	0-1'	ND	5760	ND	211	0.39	ND	48000	4.9	ND	4.5	5050	ND	2680	124	ND	6.4	1300	ND	ND	ND	ND	15.3	13.9
8	5'	ND	6650	ND	73.2	0.45	ND	51000	5.3	ND	4.7	5700	ND	3230	156	ND	7.4	1400	ND	ND	ND	ND	22.5	16.1
9	0-1'	ND	8170	ND	110	0.57	ND	25200	7.1	4.1	9.5	7160	ND	1980	175	ND	8.9	1740	ND	ND	ND	ND	17.2	20.8
9	5'	ND	5320	ND	142	0.38	ND	51300	4.1	ND	4.9	4420	ND	2190	143	ND	6.7	1230	ND	ND	ND	ND	14.6	13.2
10	0-1'	ND	5680	ND	176	0.46	ND	57500	5	ND	6.6	5810	ND	1960	127	ND	7.1	1110	ND	ND	ND	ND	16.6	14.6
10	5'	ND	4520	ND	66.5	0.37	ND	77700	4	ND	4.1	4860	ND	2510	107	ND	5.8	1010	ND	ND	ND	ND	20.6	11.8
11	0-1'	ND	7460	ND	107	0.58	ND	16700	7.9	4.3	8.8	8210	ND	1830	194	ND	9	1600	ND	ND	ND	ND	18.8	19
11	5'	ND	3580	ND	145	0.32	ND	52300	ND	ND	3.1	5210	ND	1790	158	ND	5	663	ND	ND	ND	ND	21.3	20.6
12	0-1'	ND	3300	ND	49.5	0.27	ND	11200	4.2	ND	4.6	3670	ND	855	84.8	ND	5.3	731	ND	ND	ND	ND	8.7	34.5
12	5'	ND	4680	ND	513	0.43	ND	132000	ND	ND	4.3	4660	ND	2320	201	ND	ND	ND	ND	3.1	ND	ND	17	12.7
13	0-1'	ND	5000	ND	141	0.39	ND	41100	5.1	ND	6.7	5940	ND	1530	131	ND	6.4	995	ND	ND	ND	ND	16.4	15.5
13	5'	ND	4200	ND	155	0.35	ND	77000	ND	4	5	4590	ND	2040	365	ND	5.9	732	ND	ND	ND	ND	20.1	12
14	0-1'	ND	6580	ND	120	0.52	ND	23800	7.2	ND	8.1	7070	ND	1860	177	ND	7.8	1530	ND	ND	ND	ND	16.8	18.9
14	5'	ND	5720	ND	63.9	0.44	ND	101000	4.5	ND	4.1	5810	ND	3030	117	ND	ND	1200	ND	ND	ND	ND	23.5	15

Table 3
Previous Study Sampling Results
EXPLOSIVE COMPOUNDS
(EPA 8330)

(PPM)

BOREHOLE #	DEPTH OF SAMPLE	HMX	RDX	1,3,5 TRINITROBENZENE	1,3-DINITROBENZENE	NITROBENZENE	TETRYL	4,6-DINITROBENZENE	2,4,6-TRINITROTOLUENE	2,6-DINITROTOLUENE	2,4-DINITROTOLUENE
1	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	10'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	10'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
13	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
13	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	0-1'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	5'	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 4
Baseline Sampling Analytes

COMPOUND GROUP	COMPOUND	EPA METHOD
METALS		6010
	Antimony	6010
	Aluminum	6010
	Arsenic	6010
	Barium	6010
	Beryllium	6010
	Cadmium	6010
	Calcium	6010
	Chromium	6010
	Cobalt	6010
	Copper	6010
	Iron	6010
	Lead	6010
	Magnesium	6010
	Manganese	6010
	Molybdenum	6010
	Nickel	6010
	Potassium	6010
	Selenium	6010
	Silver	6010
	Sodium	6010
	Thallium	6010
	Vanadium	6010
	Zinc	6010
	Mercury	7471
Gross Alpha and Beta		9310
Sulfides		9031
SemiVOCs		8260/8270
Soil Moisture		ASTM D 2216
Explosive Compounds		8330
	HMX	8330
	RDX	8330
	1,3,5-Trinitrobenzene	8330
	1,3,5-Dinitrobenzene	8330
	Nitrobenzene	8330
	Tetryl	8330
	2,4,6-Trinitrotoluene	8330
	2,6-Dinitrotoluene	8330
	2,4-Dinitrontoluene	8330
	2-Nitrotoluene	8330
	3-Nitrotoluene	8330
	4-Nitrotoluene	8330

3.3 ANALYSIS RATIONALE

In previous studies, samples have been analyzed for Metals (EPA Method 6010) and Explosives (EPA Method 8330). This was sufficient to characterize surface soils because all volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC) would not be present. The explosive episode would vaporize all VOCs The potential for SVOCs to be present in the soil after nearly one year since the last detonation episode is low. Thermal destruction and natural degradation processes are two reasons SVOCs would not be present after one year. However, since the basis for this study is to characterize the old OD trenches, SVOCs will be added to the analyte listing (See Table 1).

Previously NMED has requested an analysis of the entire list of compounds in HWMR Appendix VIII type of analysis spectrum. Many of these constituents can be ruled out because of the process knowledge and munitions involved in detonation. As discussed above we can rule out VOCs because they become vaporized during the detonation episode and the Bang Box Study (Johnson 1991 and 1993). No Polychlorinated Biphenols are present in the munitions treated at the range, nor have any waste oils or fluids potentially containing PCBs been used. Pesticides and herbicides are not treated at the OD unit. Although Gross Alpha and Beta measurements are on the list of analytes, no munitions or weapons associated with nuclear compound have ever been treated or utilized on Melrose AFR.

Based upon this rationale, samples will be analyzed for a modified Appendix VIII list. These analytes are listed in Table 4

SECTION 4: SAMPLING PROCEDURES AND METHODOLOGY

4.1 SAMPLE LOCATION:

Sample locations will be those depicted with squares in Figure 1. The vertical extent of sampling, ranging from the upper 6 inches to a depth of 15 feet, is presented for each sample location in Table 2. These sample locations should sufficiently identify any contamination in subsurface soils.

4.2 QUALITY CONTROL SAMPLES:

This section addresses requirements for field QC samples. Field QC is monitored by a variety of QC samples taken with sufficient frequency to verify the quality of field samples. Field rinsates will be collected during each sampling

event to ensure decontamination procedures in the field are adequate to prevent carryover of contamination from one sampling area to the next. Field rinsate blanks shall be collected by rinsing cleaned equipment with American Society for Testing and Materials (ASTM) Type II water and collecting the runoff as a sample. Field duplicates (samples taken at the same sampling location) will be collected during each sampling event. These duplicates are used to ensure that the sampling procedure is reproducible and that the sample is representative of the location. One duplicate sample will be taken for every ten baseline samples collected. For each mobilization of sampling (daily) one equipment blank sample will be collected.

4.4 SAMPLING PROCEDURES

Required sampling equipment includes a soil auger for excavation, 100 - 500-mL glass vials, plastic caps, small stainless steel or Teflon-lined trowel, small stainless steel or Teflon-lined spatulas/scoops/spoons, and gummed labels for sample identification. Sampling procedures will be performed in accordance with ASTM D 1452, "Standard Practice for Soil Investigation and Sampling by Auger Borings," where applicable. Sampling procedures for the three sampling areas are as follows:

4.5 CONTAMINATION CONTROL

Sampling tools and equipment will be protected from contamination sources before sampling and decontaminated before and between sampling points. Sample containers should also be protected from contamination sources. Sampling personnel will wear chemical-resistant gloves when handling the sampling equipment and samples. Gloves will be decontaminated or disposed of between samples.

To prevent cross contamination, sampling equipment will be subject to decontamination procedures following sample collection at each location. Sampling equipment will be decontaminated in a decontamination zone by being:

- brush-scrubbed in tap water and Liquinox detergent wash in a tub to remove any soil from the equipment;
- rinsed in tap water in a separate tub;
- rinsed in deionized water;
- rinsed in isopropanol rinse;
- air-dried in an area upwind of the decontamination process; and
- stored for future sampling after being wrapped in aluminum foil (shiny side out).

4.6 HEALTH AND SAFETY PROCEDURES

Personnel performing sampling activities will utilize personal protective equipment such as rubber gloves, boots, aprons, and eye protection, if deemed necessary. Personnel will not be permitted to conduct any sampling until they have been cleared by the range contractor and EOD personnel. Sampling personnel will be properly trained in hazardous waste sampling, and will have appropriate medical monitoring and certification. Sampling personnel will also be briefed by Cannon AFB on the hazards of sampling explosive compounds.

5. SAMPLING HANDLING AND CHAIN OF CUSTODY

Chain Of Custody (COC) procedures will be followed to track possession of the samples from the time the samples are collected until the analytical data from the samples are received and recorded. For all soil samples, procedures will begin once sampling is complete. A sample will be considered under custody if it is:

- in the possession of the sampling team;
- in view of the sampling team; or
- transferred to a secure area.

An area is considered secure only when it is locked and access is controlled. The sampling team leader is responsible for custody of the collected samples in the field until they have been properly transferred to the shipping coordinator, who is responsible for sample custody until the samples are properly packaged, documented, and released to a courier or directly to the analytical laboratory. A COC record such as the one shown in Fig. 2 will be used for the sampling effort.

5.1 SAMPLE CONTAINER AND PRESERVATION REQUIREMENTS

The following arrangements will be made ahead of time for the selected laboratory to conform to the following special requirements:

- Method 6010 Elemental Metals: Refrigerate the samples at 4°C until analysis.
- Method 7471 Mercury: Refrigerate the samples at 4°C until analysis.
- Method 8330 Explosive Residues: If soil samples are wet, they should be air dried at room temperature or colder. Refrigerate the samples at 4°C until analysis.
- Method 8260/8270 Semi-Volatile Organic Compounds: Refrigerate the samples at 4°C until analysis.

Table 5 summarizes the container, preservative, and holding time requirements for the samples to be collected.

Table 5.
SUMMARY OF SAMPLE CONTAINER, PRESERVATIVE, AND HOLDING TIME REQUIREMENTS.

SW 846 Method	Analyte	Container	Preservative	Holding time
6010	elemental metals	600-ml wide-mouthed glass or plastic jar	none, cool, 4°C	14 days to extraction 26 months after extraction
7471	mercury	400-ml wide-mouthed glass or plastic jar	none, cool, 4°C	14 days to extraction 28 days after extraction
8330	explosive residues	60-ml wide-mouthed amber glass jar with Teflon-lined cap	none, cool, 4°C	14 days to extraction 40 days after extraction
8260/ 8270	semi-volatile organics	60-ml wide-mouthed amber glass jar with Teflon-lined cap	none, cool, 4°C	14 days to extraction 40 days after extraction

5.2 PACKAGING AND TRANSPORTATION

At the end of each sampling day, samples will be packaged in shipping containers with ice packs. The samples will be carefully packaged so that they will not break during shipping. Each shipping container will be sealed with a custody seal and shipped to the analytical laboratory by an overnight delivery service.

6. DOCUMENTATION OF ACTIVITIES

6.1 SAMPLE CODING

Labels for sample containers will be uniquely coded to identify the individual composite sample's location, the treatment unit, and date. Examples of a sample code is listed below.

- OD1401 - Sample collected from borehole #14 at interval 1 (0-1')

6.2 SAMPLE IDENTIFICATION

The samples collected will be identified by a tag or other means (e.g., tape) along with the following information:

- Collector name,
- Sample code,
- Place of collection (facility and location),
- Date sample taken, and
- Time sample taken.

Any other information deemed necessary will also be added to the tag.

6.3 FIELD LOGBOOKS

Bound, water-resistant field logbooks and waterproof black ink pens will be used to document the methodology, procedures, and events pertaining to sample and data acquisition. The logbooks will be considered formal documents representing a complete and organized record of all field activities. The entries will include, but not be limited to the following:

- personnel present;
- name of sampler(s)
- date and time of every recording;
- work location;
- description of work and treatment process;
- purpose of sampling;
- environmental conditions (previous 24 hr and present weather conditions, amount and date of last precipitation, and any other conditions or activities that would affect samples);
- soil sample descriptions;
- description and location of area sampled;
- sample numbers;
- field QC data;
- other important notes on field activities, conditions, or problems; and initials/signature of person entering data.

Entries made in the logbook should be of sufficient detail to reconstruct the taking of a sample by the reading of the entries and information recorded in it. No erasures or deletion marks are permitted. If a mistake is made in a logbook, it is corrected by placing a line through the error and rewritten in the note section.

7. LABORATORY ANALYSIS

7.1 LABORATORY

Design and execution of the testing program will be coordinated with an analytical chemist with experience in contaminated soil testing. The laboratory report will state the following in distinguishable print:

- dates of sampling and testing,
- sample descriptions and numbers,
- name and address of the laboratory performing the tests,
- name and qualifications of the person performing the test,
- test method used for all tests,
- detection limits achieved, and
- name and model number of major instruments used.

EPA SW-846 and American Standard for Testing Materials (ASTM) address all procedures proposed in this SAP. Extracts will be analyzed using Method 7471 for mercury and Method 6010 for elemental metals. The Method of Standard Addition will be performed for each metal on one of the submitted samples per sampling event. The laboratory will be required to achieve the required or estimated detection limits as specified in EPA SW-846. If equivalent methods are used, this must be justified in advance. Approval for any equivalent methods employed by the laboratory will be at the discretion of Cannon AFB and NMED.

7.2 Quality Assurance/Quality Control (QA/QC)

For all tests, the samples will be spiked with known quantities of the hazardous constituent and spike concentration and percent recovery reported. The surrogate spike recoveries will be reported for all organic tests. Results from method blanks on the samples will be submitted. Blanks will not be subtracted. The method of how the reported lower detectable limit was determined must also be reported. To ensure that the established data quality objectives (DQOs) can be attained, the level of analytical quality achieved will be at least Level III. One set of samples (samples collected in any one day or one sample package) per year will undergo the more rigorous QA/QC to ensure data of Level IV data quality. The laboratory will report data equivalent to Contract Laboratory Program (CLP) Routine Analytical Services deliverables. Data will be sufficiently documented to allow personnel to review and evaluate data quality.

7.3 SAMPLING DATA QUALITY OBJECTIVES (DQOs)

DQOs are quantitative and qualitative statements specified to ensure that data of known and appropriate quality are obtained during sampling. The overall objective of sampling is to provide an accurate, precise, and representative confirmation that the OD unit treatment process is not contaminating surrounding soils above RCRA action or background levels. DQOs will be followed in terms of precision, accuracy, representativeness, completeness, and comparability (PARCC). The PARCC parameters indicate data quality. The procedures described in this section are designed to obtain PARCC, for each sampling and analytical method and analysis.

7.3.1 Precision

Precision is a measure or estimate of the reproducibility of measurements under a given set of conditions. Specifically, precision is a qualitative measure of the variability of a group of measurements compared to their average value. A simple measure of precision is the standard deviation. The methods and protocols found in the most recent version of EPA SW-846 will be used by the laboratory performing the sample analyses.

The overall precision of measurement data is a mixture of sampling and analytical factors. The objective for precision in the chosen laboratory for certain samples is to equal the precision demonstrated for the CLP methods on similar samples. Laboratories commonly determine precision from duplicate samples; thus, precision is usually expressed as relative percent difference (RPD). The calculation for RPD is:
where V1 and V2 are the reported concentrations for each duplicate sample.

7.3.2 Accuracy

Accuracy is the ability to obtain a true value. The accuracy of an entire measurement system indicates any bias that exists; this is generally difficult to measure through the entire data collection process, since there are potentially many sources of error. These include the sampling process, field and laboratory cross contamination, preservation, handling, sample matrix, sample preparation, and analytical techniques. Sampling accuracy can be assessed by evaluating the results of field blanks; and analytical accuracy, through use of known and unknown QC samples and matrix spiked samples.

Laboratory accuracy is checked by adding a known amount of surrogate compounds to a sample and ensuring that amount is recovered in the analysis.

Surrogate compounds are compounds unlikely to be found in actual samples. This addition of a compound(s) is referred to as spiking, and the samples are referred to as spikes. The objective for accuracy in the chosen laboratory for certain samples is to equal the accuracy demonstrated for the CLP methods on similar samples being analyzed for similar concentrations of contaminants. Laboratory accuracy is expressed as percent recovery (PR), calculated by:

where So is the background value obtained by analyzing the sample (before the spike is added), Sa is the concentration of the spike added to the sample, and Ss is the value obtained by analyzing the sample after the spike has been added.

7.4 SAMPLE RETURN OR DISPOSAL

Unless directed otherwise by Cannon AFB, the laboratory will dispose of all soil samples following analysis. The laboratory will provide certification that its facilities qualify for the exemption in 40 Code of Federal Regulations (CFR) 261.4(d), which excludes waste samples from many hazardous waste management requirements. In addition, all laboratories will provide the base with an explanation of the disposal practices employed with respect to sample residual.

8. REFERENCES

New Mexico Environment Department, Hazardous and Radioactive Materials Bureau. "Notice of Deficiency Comments for Melrose Air Force Range RCRA Operating Permit." December 22, 1992, Santa Fe, New Mexico.

Snedecor, G.W. and Cochran, W.G. *Statistical Methods*, 6th Edition, Sect. 4.14

U.S. Environmental Protection Agency (EPA) November 1986. *Test Methods for Evaluating Solid Waste,* SW-846, 3rd Edition, Office of Solid Waste and Emergency Response, Washington, D.C.

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U.S. Environmental Protection Agency (EPA) November 1986. *Test Methods for Evaluating Solid Waste,* SW-846, 3rd Edition, Office of Solid Waste and Emergency Response, Washington, D.C.

Table C-3. Waste analysis data: typical ordnance suitable for open-detonation.

Type of waste	Constituents		General or typical concentration or amount NEW (lbs.)	Method: AFR TO Reference Disposal Paragraph[a]
	Major Reactant(s)	Major inert (casings)		
Adapter, ADU-449/B	Single-based	Steel	0.0083	OD: No reference
Adapter, booster nose	Tetryl	Steel	0.3900	OD: No reference
Adapter, booster tail	Tetryl	Steel	0.8800	OD: No reference
Assembly, explosive transfer, 188-1-5	Tetryl	Steel	0.1300	OD: 9-31
Assembly, initiator	Single-based	Steel	1.00	OD: 6-29, 9-31
Blasting cap	PETN/Tetryl	Aluminum	0.0019	OD: 6-7
Block, demolition	TNT	Paper and Tin	2.0	OD: 6-29
Cartridge, 30mm HEI	RDX/Incendiary mix	Steel and Aluminum	0.0916	OD: 6-9
Cartridge, 40mm M674	Single-based	Steel and Aluminum	0.2156	OD: 6-9
Cartridge, 40mm HE	RDX/TNT	Steel and Aluminum	0.0780	OD: 6-8
Cartridge, 40mm practice	Single-based	Steel and Aluminum	0.0008	OB: 3-6; OD: 6-9
Cartridge, 40mm smoke	Single-based	Steel and Aluminum	0.1722	OB: 3-6; OD: 6-9
Catapult, rocket, CKU-5A/A	Single-based	Aluminum	5.500	OD: No reference
Charge, demo, C-4	RDX, Polyisobutylene	Plastic	30.0	OD: 6-29
Charge, shaped, C-4	RDX, Polyisobutylene	Steel	0.8300	OD: 6-29
Charge, spotting, CXU-3A/B	Black powder phosphorus	Aluminum	0.0830	OD: 6-39
Cluster, MK20 Mod 3, Rockeye	Tetryl/RDX	Aluminum	100.0	OD: 6-24

Table C-3 (continued)

Type of waste	Constituents		General or typical concentration or amount NEW (lbs.)	Method: AFR TO Reference Disposal Paragraph[a]
	Major Reactant(s)	Major inert (casings)		
Cord, detonation	PETN/RDX	Plastic	0.0070	OB: 3-6; OD: 6-40
Detonator, electric	RDX	Steel	0.0003	OB: 3-6; OD: 6-7
Explosive scent, K-9	Tetryl/RDX	None	8.0	OD: No reference
Fuze, blasting	Tetryl/RDX	Plastic	0.0070	OD: No reference
Fuze, bomb nose	Tetryl/RDX	Aluminum and Steel	0.1640	OD: No reference
Fuze, bomb tail	Tetryl/RDX	Aluminum and Steel	0.0150	OD: No reference
Fuze, delay, M9	Tetryl/RDX	Aluminum	0.0002	OD: No reference
Fuze, extension, M1A1	Tetryl/RDX	Steel	2.00	OD: No reference
Fuze, FMU-130/B	Tetryl/RDX	Aluminum, Steel, and Plastic	0.3600	OD: No reference
Fuze, FMU-139A/B	Tetryl/RDX	Aluminum, Steel, and Plastic	0.2778	OD: 6-33
Fuze, FMU-54A/B	Tetryl/RDX	Aluminum and Steel	0.3600	OD: 6-33
Fuze, MK339	Tetryl/RDX	Aluminum and Steel	0.0006	OD: 6-33
Fuze, practice M228	Tetryl/RDX	Aluminum and Steel	0.0030	OD: No reference
Rocket motor	Black powder	Tin	1.100	OB/OD: 8-5 to 8-15; 9-31
Signal kit, A/P25-S-1	Single-based	Tin	0.0812	OD: 6-8; 6-41
Signal kit, A/P25-S-2	Single-based	Tin	0.0812	OD: 6-8; 6-41
Simulator, projectile, air burst, M27 or M74	Black powder	Paper and Plastic	0.0825	OD: 6-41

Table C-3 (continued)

Type of waste	Constituents		General or typical concentration or amount NEW (lbs.)	Method: AFR TO Reference Disposal Paragraph[a]
	Major Reactant(s)	Major inert (casings)		
Simulator, booby trap, M117, M118, or M119	Black powder	Paper and Plastic	0.0095	OD: 6-41
Simulator, detonation, M80	Black powder	Paper and Plastic	0.0070	OD: 6-41
Simulator, grenade, M116	Black powder	Paper and Plastic	0.0813	OD: 6-41
Simulator, projectile, ground burst, M115	Black powder	Paper and Plastic	0.1410	OD: 6-41

Notes: (1) Air Force Technical Order 11A-1-42, *General Instructions for Disposal of Conventional Munitions* was used for determining which waste munitions items were suitable for demilitarization by either OD or OB/OD. The reference cited in the last column indicates the disposal paragraph which discusses the specific disposal process. For instance, paragraph 3-6 applies to OB, paragraph 6-8 applies to OD, and the combination 3-6/6-8 applies to both processes.

(2) Refer to the TO for details on all disposal processes. There are some munitions items for which the preferred disposal process was not referenced in the TO. These were deemed suitable for OD based on the type of ordnance item and the nature of its explosive constituent.

[a]If both open burning and open detonation are allowable disposal techniques, then both recommended disposal methods are listed.

HE = high explosive
HEI = high explosive incendiary
LR = long range
NEW = net explosive weight
PETN = pentaerythritol tetranitrate
RDX = cyclotrimethylenetrintramine
Tetryl = trinitrophenylmethylnitramine
TNT = trinitrotoluene
TP = target practice

DEPARTMENT OF THE AIR FORCE

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

12 MAR 1993

27 FW CC
100 S DL Ingram Blvd Suite 100
Cannon AFB NM 88103-5214

Ms Barbara Hoditschek, Program Manager
RCRA Permit Program
State of New Mexico Environment Department
Hazardous & Radioactive Materials Bureau
PO Box 26110
Santa Fe NM 87502-6110

RE: RCRA Subpart X Part B Application 100-Year Flood Plain Study

Dear Ms Hoditschek

We are submitting the 100-Year Flood Plain Study for the Open Burn and Open Detonation (OB/OD) Thermal Treatment Facility at Melrose Air Force Range. The study indicates that we will need to raise the present berm one additional foot to protect the facility from a 100-year flood. A project is in the planning stage to raise the current berm height.

We are awaiting approval of our Sample and Analysis Plan for the OB/OD unit submitted to your office 13 January 1993. Once approved, our range personnel will schedule the necessary work.

Additional information will be provided to your office as we receive and review the material for accuracy. Your cooperation and assistance with Melrose Air Force Range permitting concerns are greatly appreciated. Questions concerning Melrose Air Force Range may be directed to Ms Vera Wood at 784-2739 or Mr Jim Richards at 784-4639.

Sincerely

RICHARD N. GODDARD
Brigadier General, USAF
Commander

1 Atch
100-Year Flood Plain Study

Global Power for America

United States Department of the Interior

GEOLOGICAL SURVEY

Water Resources Division
4501 Indian School Road NE, Suite 200
Albuquerque, NM 87110-3929

January 20, 1993

MELROSE AIR FORCE RANGE

100 YEAR FLOODPLAIN STUDY

Problem Statement:

Melrose Air Force range requires an operating permit for an open burn/open detonation unit situated in the NW 1/4 SW 1/4 SW 1/4, section 27, T. 1 N., R. 30 E. The 100 year floodplain boundary and elevation at the detonation unit needs to be determined.

Work Statement:

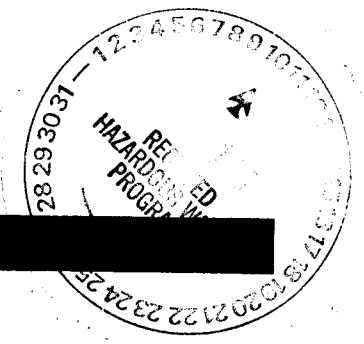
Provide a letter report of the 100 year floodplain hydrology and hydraulic analysis. The following are the estimated work tasks.

1. Perform surveys with a 'Lietz' Total Station of the channel and subbasin hydraulic geometry. Survey the perimeter of the detonation unit for floodplain location and reference point monument.

2. Perform hydrologic analysis for the estimated 100 year flood discharge using HEC 1 Flood Hydrograph Package presented by the U.S. Army Corps of Engineers, 1990. In addition, the 100 year discharge is to be estimated with U.S. Geological Survey regional regression equations. A current report available for this analysis is WRI 86-4104 by Waltemeyer, 1986.

3. Perform hydraulic water surface profile computations using HEC 2 Water Surface Profiles presented by the U.S. Army corps of Engineers, 1990 or WSPRO, a Computer Model for Water Surface Profile Computations presented by the Federal Highway Administration/U.S. Geological Survey, 1990.

4. Report preparation and mandatory review.



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FILE: RED/CAFM/93

United States Air Force

Environmental Restoration Program

GEOLOGY AND ANALYTICAL RESULTS FOR SOILS AT THE OPEN BURN/OPEN DETONATION THERMAL TREATMENT FACILITY

Melrose Air Force Range
New Mexico

August 1993

RCRA SUBPART X PART B APPLICATION
OPEN BURN/OPEN DETONATION THERMAL TREATMENT FACILITY
MELROSE AIR FORCE RANGE, NEW MEXICO

August 1993

GEOLOGY AND ANALYTICAL RESULTS FOR SOILS AT THE OPEN BURN/OPEN DETONATION THERMAL TREATMENT FACILITY, MELROSE AIR FORCE RANGE, NEW MEXICO

PREPARED FOR

27 CES/CEV
Environmental Management Flight
Cannon Air Force Base, New Mexico 88103
505-784-4639

PREPARED BY

U.S. GEOLOGICAL SURVEY, WATER RESOURCES DIVISION
4501 INDIAN SCHOOL ROAD NE, SUITE 200
ALBUQUERQUE, NEW MEXICO 87110
505-262-5342

NOTICE

This report has been prepared for Cannon Air Force Base by the U.S. Geological Survey, Water Resources Division, New Mexico District, for the purpose of providing technical information for completion of their Resource Conservation Recovery Act (RCRA) Subpart X Part B operating permit at Melrose Air Force Range. Because the report relates to actual or possible releases of potentially hazardous substances, its release prior to an Air Force final decision on remedial action may be in the public's interest. The limited objectives of this report and the ongoing nature of the baseline study for the permit application, along with the evolving knowledge of site conditions and chemical effects on the environment and health, must be considered when evaluating this report because subsequent facts may become known that may make this report premature or inaccurate. Acceptance of this report in performance of the contract under which it is prepared does not mean that the Air Force adopts the conclusions, recommendations, or other views expressed herein, which are those of the contractor only and do not necessarily reflect the official position of the United States Air Force.

PREFACE

The purpose of this investigation is to determine the site geology and the possible contamination of soils in or immediately adjacent to the Open Burn/Open Detonation Thermal Treatment Facility on the Melrose Air Force Range, New Mexico, where contaminants may have been released from the operation of the Open Burn/Open Detonation Thermal Treatment Facility.

Project Chief of this investigation is Jerry Larson. Technical support is provided by employees of the New Mexico District of the U.S. Geological Survey, Water Resources Division. Text and illustrations were prepared by the Publications Unit of the New Mexico District. Chemical analyses were performed by Rocky Mountain Analytical Laboratory, a division of Enseco, Arvada, Colorado. Drilling was performed by the U.S. Geological Survey.

Appreciation is extended to the base points of contact--Captain Gregory Walters and Ms. Vera Wood, Environmental Management, Cannon Air Force Base. The assistance and cooperation of all involved in the investigation at Melrose Air Force Range are greatly appreciated.

This work was performed between April and July 1993. Captain Gregory Walters, Environmental Manager, Cannon Air Force Base, is the Technical Project Manager for this investigation.

Approved:

Russell K. Livingston
District Chief, New Mexico
U.S. Geological Survey

Captain Gregory Walters
Technical Project Manager
Cannon AFB, New Mexico

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1.0 INTRODUCTION

1.1 Description of the Melrose Air Force Range Subpart X Part B Permit Application

The U.S. Force (USAF), in performing its primary mission of defense of the United States, has frequently engaged in operations that deal with toxic and hazardous materials. Cannon Air Force Base has applied for an RCRA Subpart X Part B Permit to treat reactive material in expended ordnance. This baseline study will identify the constituents of past toxic and hazardous materials burned or detonated at the Open Burn/Open Detonation site in order to control hazards to public health and the environment. The Department of Defense (DOD) issued Defense Environmental Quality Program Policy MemorandUM (DEQPPM) 80-6 in June 1980, which mandated that hazardous waste material sites on DOD installations be identified. The USAF implemented DEQPPM 80-6 in December 1980. The current policy is contained in DEQPPM 81-5, dated December 11, 1981, and was implemented by U.S. Air Force Message 211807Z in January 1982.

DOD policy is to identify and evaluate suspected problems associated with past hazardous contamination, to control hazardous contamination, and to control hazards to the public health and welfare. The baseline study will be conducted in accordance with the basis for response actions on USAF installations under the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the Superfund Amendment and Reauthorization Act (SARA) of 1986, the Resource Conservation and Recovery Act (RCRA) of 1976, the Hazardous and Solid Waste Amendments (HSWA) of 1984, and Executive Order 12316.

The current study of the Open Burn/Open Detonation Thermal Treatment Facility (hereafter referred to as OB/OD) on Melrose Air Force Range (MAFR) is a baseline RCRA investigation.

1.2 History of Past Work at the Installation

1.2.1 Previous investigative activities and documentation

No previous investigations have been performed at this installation. An Environmental Impact Statement was completed on October 17, 1989, by Science Applications International Corporation (SAIC) for the MAFR.

1.3 Installation Description

MAFR is located approximately 10 miles southwest of Melrose and approximately 30 miles west-southwest of Clovis in east-central New Mexico (fig. 1.3.1). The Range consists of 77,120 acres in Roosevelt County, New Mexico. The Air Force has 15,680 acres of restrictive easement of the total acreage, which can be used for cattle grazing or gas/oil exploration or extraction. Some crops are grown in the northern sections of the Range but the primary use is for cattle grazing. A Range support facility near the center of the Range houses a fire station, maintenance area, TV camera station for monitoring ordnance practices, and other support facilities (fig. 1.3.2). The basic mission of MAFR is to support bombing and air-to-ground gunnery training missions by Air Force, Air Force Reserve, Air National Guard, Navy, and Marine units. The Range consists of a composite day/night simulated special and conventional weapon delivery range and a day/night tactical range.

1.4 Description of Study Area

The OB/OD is located approximately 1.2 miles south of the Range support facility as shown on figure 1.3.2. The site is an approximately 700-foot-diameter circular area with a burn pit in the center (fig. 1.4.1). The burn pit is used infrequently and consists of burning material with the aid of unused diesel fuel. Surrounding the burn pit is a 200-foot area used for detonations. Detonations are performed by digging trenches and exploding the ordnance within the trench.

1.4.1 Project objectives

In this project, the Geological Survey will investigate the OB/OD on MAFR to determine site geology and possible hazardous materials in the soil.

The objective of this effort is to conduct a facility investigation of the OB/OD on MAFR and to identify and characterize past releases that may have occurred. Information presently available concerning site use, history, and type of waste is minimal. This investigation will collect data to determine the type of wastes and extent of contamination at the site. This site is remote and few people (receptors) are near the sites who would come in contact with airborne contaminants released from the sites. The receptors of most concern are people working on the base who come in contact with surface water or ground water from supply wells or residents of the area who could come in contact with ground water or surface water that has moved off the base. The pathways for contaminant release are air, dust, surface water, and ground water. Because no perennial streams are on base, contaminants in surface water would be transported during the rare times when runoff results from precipitation. The pathway of greatest potential if contaminants are released is ground water. Ground water on base is generally deep, so an important consideration in this study is to determine if contamination is moving through the unsaturated zone toward the ground water.

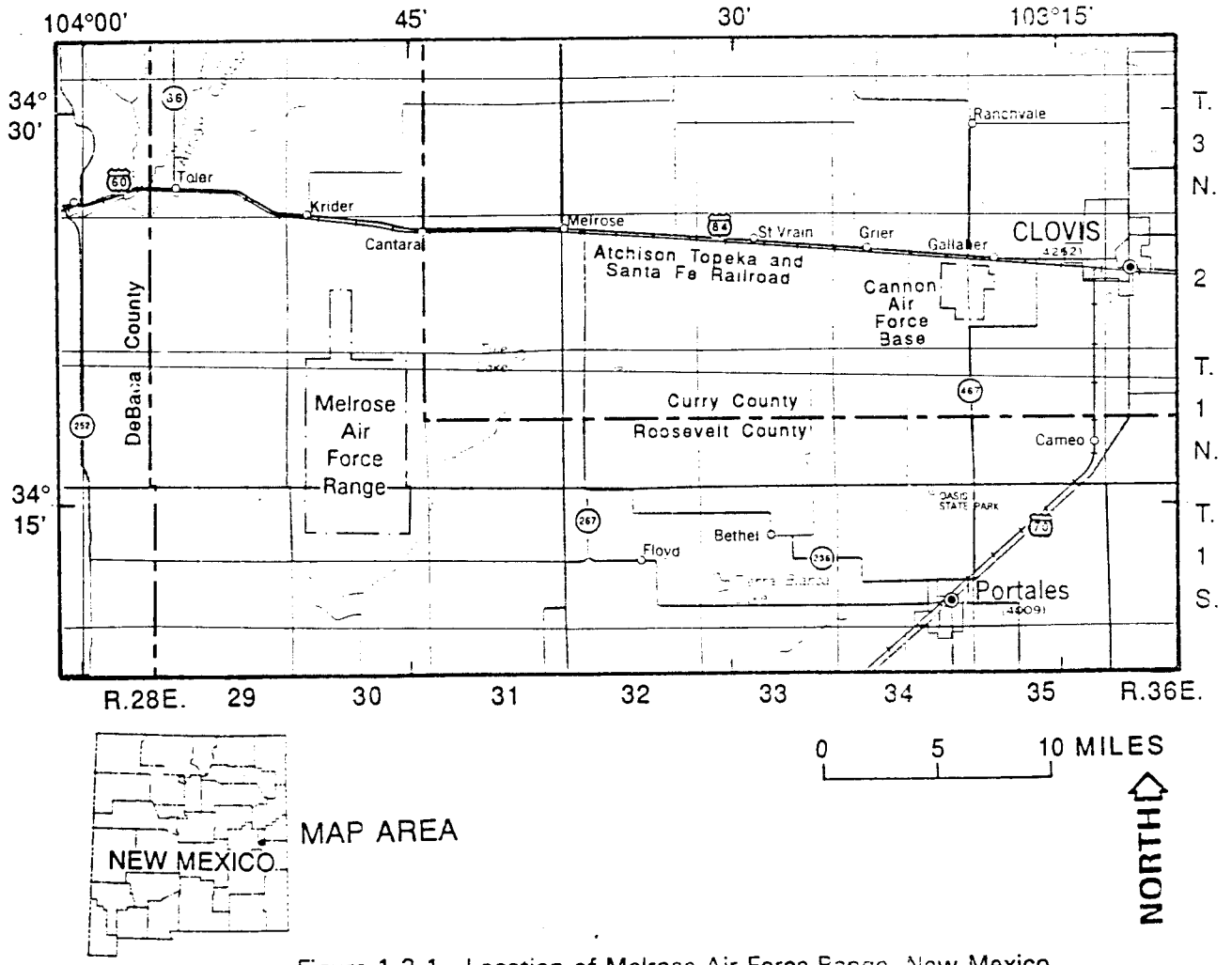


Figure 1.3.1.--Location of Melrose Air Force Range, New Mexico.

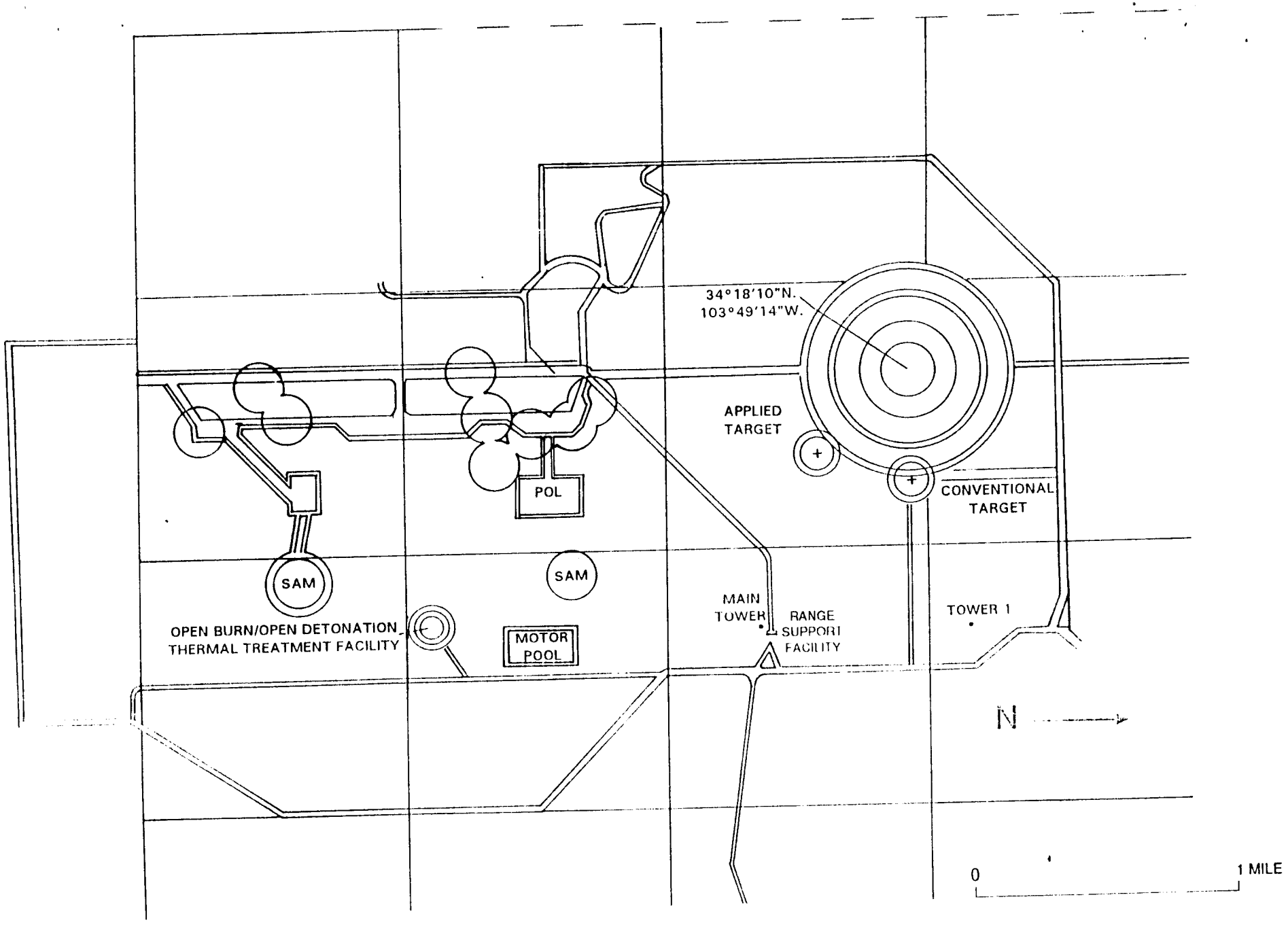


Figure 1.3.2.--Facilities on Melrose Air Force Range.

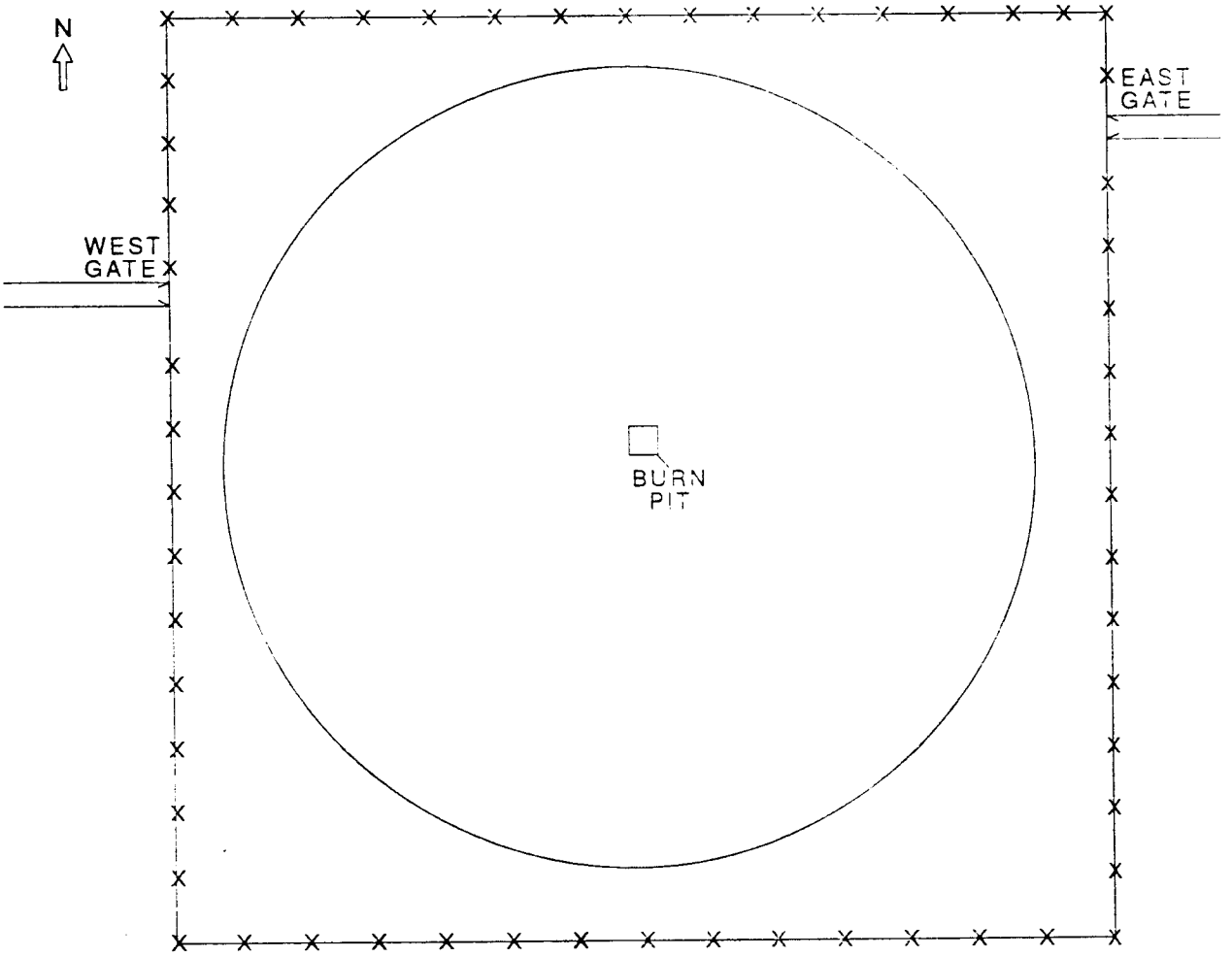


Figure 1.4.1.--Configuration of Open Burn/Open Detonation Thermal Treatment Facility.

2.0 SUMMARY OF EXISTING INFORMATION

2.1 Installation Environmental Setting

A summary of the available information on the environmental setting of MAFR is discussed in the following sections. This includes the geographic setting, geology, soils, ground water, surface water, climate, biology, and demographics.

2.1.1 Geographic setting

MAFR is located in the High Plains section of the Great Plains physiographic province. The region is essentially a plateau, bounded on the north by the Canadian River and on the east and west by prominent escarpments rising as much as 300 or more feet above the lower lands.

The surface of the plains is flat throughout much of the area and gently undulating in the remainder. An exception to the flat surface is the Portales Valley, which is the drainage for much of MAFR. This valley is as much as 30 miles wide and drains eastward-southeastward into Texas. The drainage on MAFR is predominantly to the northeast toward the Portales Valley. Altitudes range from about 4,620 feet on the mesa at the southwest edge of the Range to 4,218 feet at the northeast corner of the Range.

2.1.2 Geology

MAFR lies on the western edge of the Ogallala Formation and is defined as a stratigraphic unit of Pliocene age. The Ogallala in the MAFR area includes valley-fill deposits of Quaternary age which consist of clay, silt, fine- to coarse-grained sand, gravel, and caliche. Lithology varies within short distances, both vertically and horizontally, and individual beds or lenses are not continuous over wide areas.

Most of the Ogallala is unconsolidated, although near the top and locally within the formation the sediments have been cemented, chiefly by calcium carbonate, to form beds of caliche. The degree of cementation varies greatly from well cemented to partially cemented. The caliche occurs in single or multiple layers in the uppermost part of the formation throughout the area.

The Ogallala Formation overlies an erosional surface incised into Triassic rocks on the MAFR. The slope of the Triassic rocks is to the east-southeast.

2.1.3 Soils

Surface soils, as described by Ross and Bailey (1967), constitute generally the first 5 feet of unconsolidated material below land surface. The soils on MAFR are generally of the Amarillo-Clovis loams and Amarillo-Clovis fine sandy loams association, and the soils on OB/CD are further subdivided into Olton loan. Olton loam consists of about 4 inches of brown to dark-brown loam that has strong granular structure and is noncalcareous. The subsoil is noncalcareous clay loam. It is about 24 inches thick and has a subangular blocky structure. The subsoil overlies a strongly calcareous layer that is 18 to 20 inches thick, light reddish brown in color, and massive. Olton loam is characterized by moderate runoff and slow interval drainage. Puddling is common following a hard rain and wind erosion is a slight or moderate hazard.

2.1.4 Ground water

The principal source of ground water on MAFR is the underlying Ogallala aquifer. The Quaternary alluvium of the Portales Valley is considered part of the Ogallala aquifer. Ground water in the Ogallala is unconfined and contained in the pore spaces of the unconsolidated or partially consolidated sediments. The saturated thickness of Ogallala aquifer material is estimated to be less than 100 feet on the Range due to its proximity to the western edge of the aquifer.

Depth to water varies from 41 feet below land surface along the Canada del Tule on the southeast corner of the Range to 128 feet along the east-central Range boundary. Ground water on the Range flows in a northeasterly direction toward the Portales Valley.

2.1.5 Surface water

MAFR has no perennial surface water. During intense precipitation, water flows in the normally dry stream channels and over land. Lakes were present during pluvial periods of the Pleistocene, but declining water tables during the Holocene led to the drying up of these lakes. Presently, ephemeral lakes form in playa basins after heavy rainfall.

2.1.6 Climate

The climate of MAFR is semiarid. Average annual rainfall recorded at Cannon AFB is 15.2 inches, most of which falls during the summer months as thundershowers. Monthly averages vary from 0.4 inches in the winter months to 2.5 and 2.7 inches in July and August, respectively. Maximum monthly rainfall is 11.4 inches in July and maximum daily rainfall is 4.8 inches. Annual snowfall for this region is 10 to 13 inches and the record snowfall is 19 inches.

Average monthly temperatures range from the mid-30's in January to the upper 70's in July. Occasional days of temperature more than 100 degrees occur in the summer; the highest recorded temperature is 106 degrees. Minimum temperatures range from the low 20's in January to the mid-60's in July; the lowest recorded temperature is 11 degrees.

Winds on the MAFR are often gusty and can average 19 miles per hour (mph) or greater. The prevailing surface wind direction is west. These west winds blow primarily from October to May. During the remainder of the year, winds tend to be from the south. Monthly wind averages range from 6 to 10 mph; the maximum recorded wind gust is 84 mph.

2.1.7 Biology

The vegetation of MAFR is classified as grassland. Grassland is dominated by various grasses but may also contain low shrubs. No fishing streams or lakes are on the Range and wildlife is sparse. Burrowing rodents are the most common form of wildlife. Several species of endangered wildlife may exist within the area, but have not been sighted on the Range. These include the southern bald eagle, the American peregrine falcon, and black-footed ferret.

2.1.8 Demographics

No major population centers are near MAFR. The nearest community is Melrose, which is about 10 miles north of the Range. Clovis and Portales are about 30 miles east of the Range. The nearest inhabitants are about 4.5 miles east of MAFR on the road into the Range.

2.2 Site-Specific Environment Setting

To design a technically sound investigation of the presence or absence of contaminant release from the OB/OD, a conceptual model of contaminant movement from the site was developed. This conceptual model was developed using available information on the nature of the site, stratigraphy, and hydrology of the MAFR area, and pertinent literature on the movement of contaminants in the unsaturated zone.

The OB/OD on MAFR overlies the Holocene alluvium and the Ogallala Formation. The Holocene alluvium generally consists of a thin veneer (less than 50 feet thick) of clay, sand, and gravel on top of the Ogallala.

The lithology of the Holocene alluvium and Ogallala Formation varies considerably in short vertical distances. Lithology ranges from clay to gravel and cobbles. Caliche or buried soil zones are penetrated at several locations at various depths. Many of these caliche zones contain considerable amounts of calcareous cemented sediments, and in some cases root casts were evident. The relatively large changes in dominant grain size and sorting in small vertical distances indicate that the vertical and lateral permeabilities of the alluvium and Ogallala vary considerably in small vertical distances. The dominant grain size of the sediments on the Range also may considerably vary laterally in short distances. No detailed geologic mapping has been done on the Range.

2.2.1 Open Burn/Open Detonation Thermal Treatment Facility

The OB/OD site is located in the south-central part of MAFR in section 27, Township 1 North, Range 30 East. The site is about 1 mile south of the main observation tower and command post for the Range.

Pathways for contaminants include air, dust, surface water, and ground water. Air pathways may result from contaminants that have a large volatility or have been blown into the air during detonations. Dust pathways can result from winds that erode surface materials that may be contaminated. Surface-water pathways are likely only during precipitation from storms that result in runoff over and through the site and eastward. Ground-water pathways may result from migration of contamination through the unsaturated zone to ground water. Receptors include site workers and base employees who work on or near the site.

The focus of the investigation at OB/OD was to determine the site geology and possible contamination in the unsaturated zone at the site. During Mary 4-6, 1993, the upper unsaturated zone was investigated using 20-foot soil borings and surface sampling. Two 20-foot borings were located within the detonation area as shown on figure 2.2.1.1. One additional 20-foot boring was drilled 200 feet west of the outer perimeter of the site to determine background. The rationale for the location chosen for the background sample was the predominantly westerly wind and the eastward-dipping alluvial sediments at this location, which provided an updip and upwind location for background samples. The 20-foot borings were sampled at 0, 5, and 10 feet for metals and explosive residue.

To better define the near-surface geology, borings were continuously cored to a maximum of 20 feet. These cores were selected on the basis of providing a good cross-sectional look at the site.

During June 3-8, 1993, two deep holes were drilled to further define the geology at depth and to locate water-yielding zones. The first hole was drilled to 180 feet and sealed and the second hole was cored to 120 feet and completed as a monitoring well. In addition, 11 shallow soil borings were drilled to collect additional soil samples at depths of 0 and 5 feet. The locations of the soil borings and the monitoring well are shown in figure 2.2.1.2.

2.2.2 Site geology

The 20-foot cores discussed above provided a good geologic description at the OB/OD site. The background hole (OB/OD-03) was cored to 16 feet. Drilling was halted due to very hard drilling--presumably caliche.

In general, the top 20 feet at the OB/OD consists predominantly of silt and minor amounts of sand, clay, and gravel. Caliche and calcification layers are scattered throughout the section. The predominant change observed between the holes is a distinctively lighter color of sediments within the impact area compared to those of the background site. The color change is attributed to the mixing of soil material during trenching operations and to the effects of exploding the ordnance. Tables 2.2.2.1, 2.2.2.2, and 2.2.2.3 are descriptions of the materials penetrated in core holes OB/OD-01, 02, and 03, respectively.

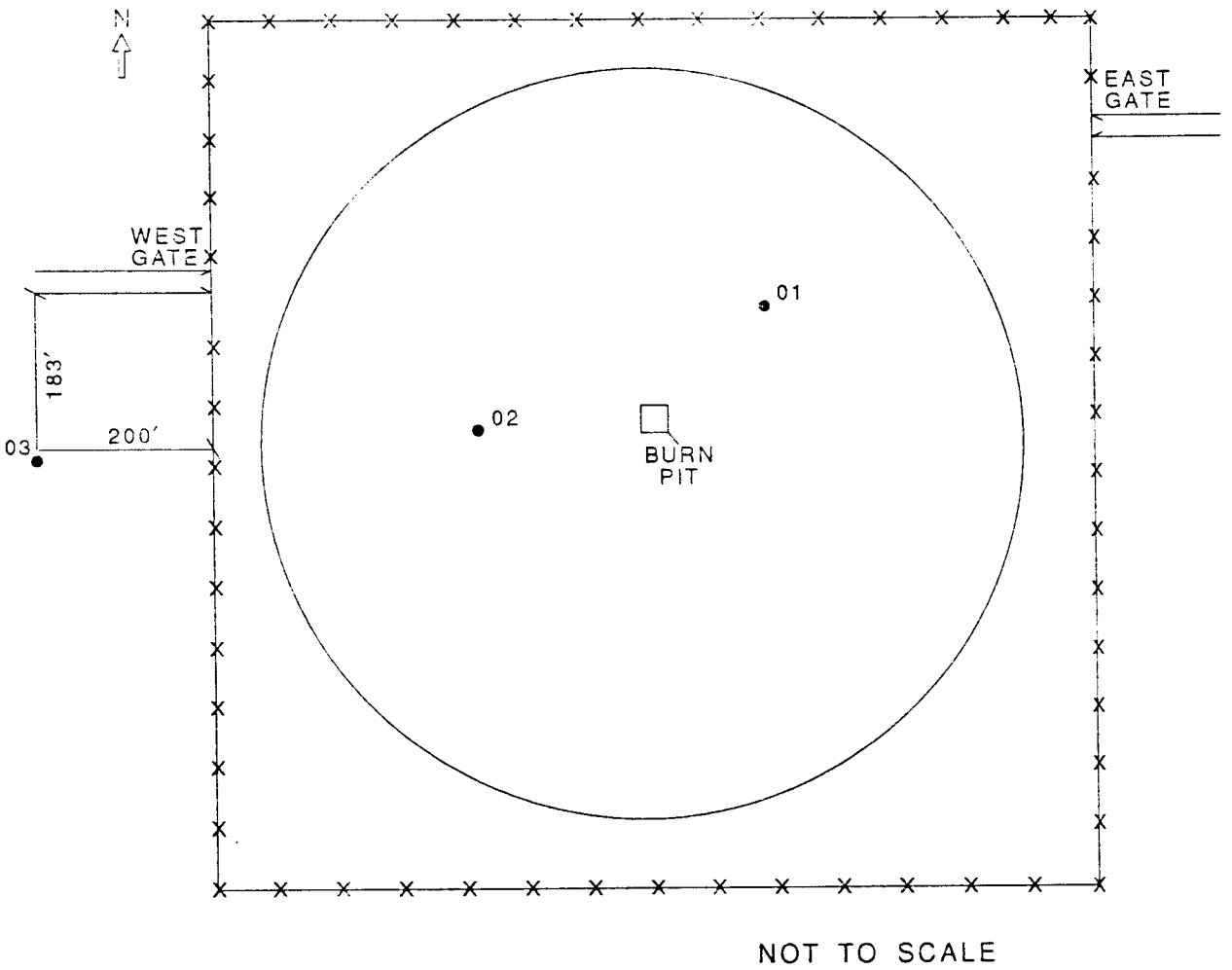


Figure 2.2.1.1.--Location of the May 4-6, 1993, soil borings on the Open Burn/Open Detonation Thermal Treatment Facility.

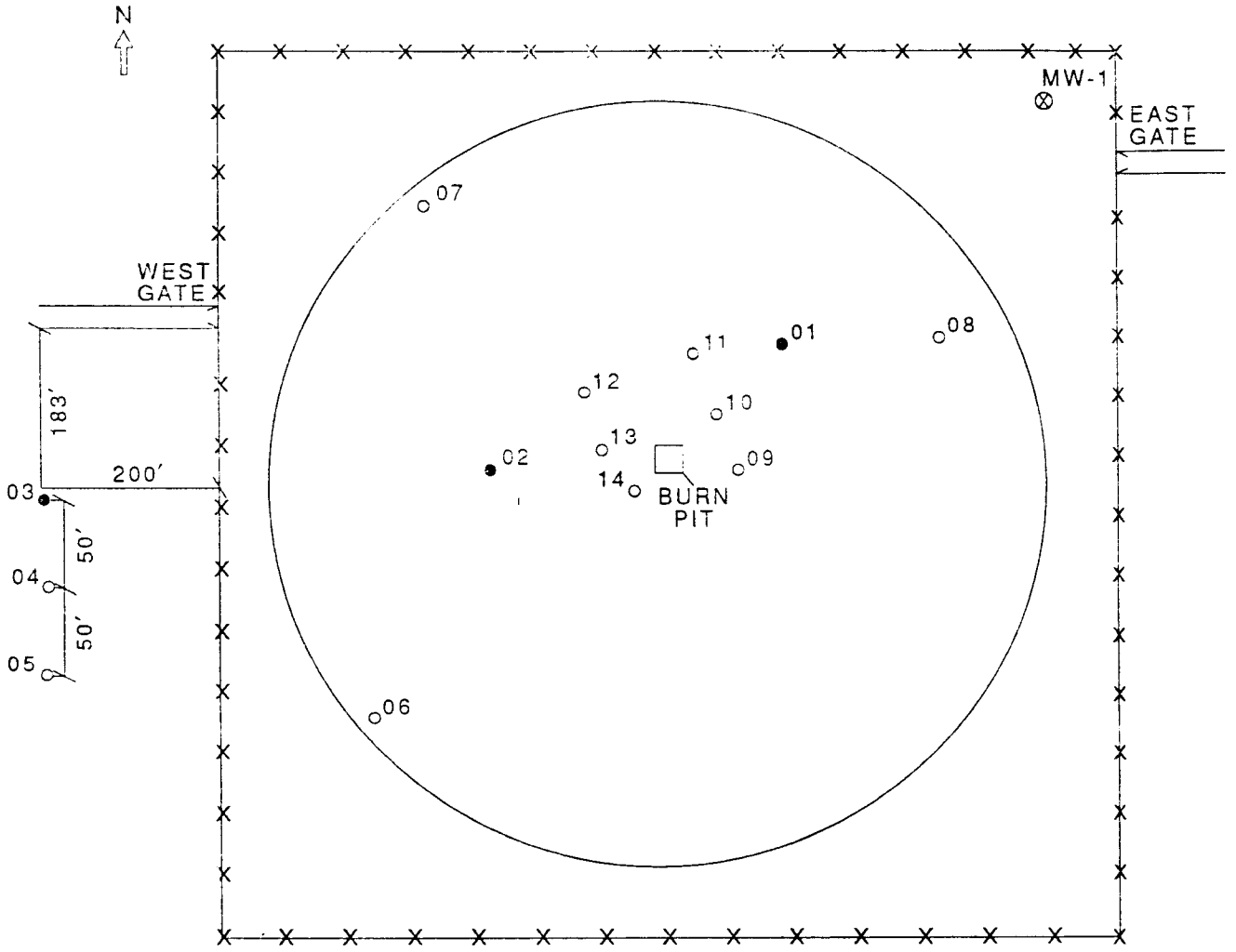


Figure 2.2.1.3.--Location of soil borings and monitoring well at the Open Burn/Open Detonation Thermal Treatment Facility.

Table 2.2.2.1.--Lithologic log of core from hole OB/CD-01 Melrose Air Force Range, NM

Depth interval below land surface (feet)	Lithologic description
1 - 2	Recovery 11". Very compacted silt (cemented). Munsell color chart; silt is grayish orange pink (5 YR 7/2). A few thin layers of calcification. Root tubes throughout this interval.
2 - 4	Recovery 22". Very similar to above interval. Still grayish orange pink (5 YR 7/2). The layers or more of a banding of the calcification has slightly increased. but not yet turned to caliche. No sand or gravel.
4 - 6	Recovery 20". Interval is still cemented silt with some very fine sand. Slight color change, light brown (5 YR 6/4). Thin bands of caliche. Also a few small bands of a darker fine sandy silt, moderate brown (5 YR 4/4). Still root tubes throughout.
6 - 8	Recovery 23". Light-brown (5 YR 6/4) compacted silt with some very fine sand, small amount of bands of caliche. No moderate-brown bands. Still root tubes.
8 - 10	Recovery 22". Still has light-brown (5 YR 6/4) compacted silt with some very fine sand. However, there are more caliche layers. The silt and caliche seem to be pressed together in layers, breaking apart in layers. Root tubes.
10 - 12	Recovery 20". Interval is basically the same as the previous sample. A slight change in color, light brown (5 YR 5/6). Slight increase in quantity of very fine sands. There are also a few pieces of small dark gray-black gravel, 1-2 mm. Root tubes.
12 - 14	Recovery 23". Same as above; decrease in the compacted layers. more loosely packed. More fine sand. Caliche is now more of a calcification with more nodules rather than layers.
14 - 16	Recovery 23". Has become more cemented silt. Most of this interval (14.7'-16') has a color change, grayish orange pink (5 YR 7/2). Less fine sand and more banding of the calcification. Almost no small gravel. Root tubes.
16 - 18	Recovery 19". Same as above (14.7'-16').
18 - 20	Recovery 24". Layered cemented silt. No small gravel. Very small percentage of fine sand. Color varies. Area with more calcification is grayish orange pink (5 YR 7/2); less calcification is light brown (5 YR 6/4). Still root tubes.

Table 2.2.2.2.--Lithologic log of core from hole OB/OD-02 Melrose Air Force Range, NM

Depth interval below land surface (feet)	Lithologic description
0 - 2′	Recovery 22". Very compacted silt. Light brown in color (5 YR 5.6) (Munsell color chart). Diameter of acetate sample tube is 28 mm. Numerous layers of caliche material, as large as the full diameter of tube. Numerous nodules of caliche throughout interval. Small amount of limestone gravel, as large as 5 mm--angular in shape. Root zones throughout core.
2′ - 4′	Recovery 22". Basically same as above. Compacted dry silt. Slight change in color, light brown (5 YR 6/4). No hard caliche layers but several irregularly banded or spotted lighter colored--probably some calcification. Root tubes throughout interval. Traces of small, gray or darker, subangular to angular gravel.
4′ - 8′	Most of material is compacted light-brown silt similar to above, but now has a large amount of poorly sorted gravel (quartz, feldspar, limestone). Gravel is generally subrounded to subangular (many angular fractured pieces). Sizes range up to diameter of sampling tube (28 mm) and probably much larger. Large amount of caliche and other lesser degrees of calcification.
8′ - 12′	Similar to previous interval only now lighter in color, grayish-orange-pink (5 YR 7/2). Much less gravel than previous interval. Overall more compacted and calcified than before (several very "tight" zones).
12′ - 15′	Tightly compacted light-brown silt with many light-colored calcified zones; slightly more gravel than previous interval (gravel is generally smaller, down to sand size). No white bands of caliche.
15′ - 20′	Compacted brown silt, light-brown (5 YR 5/6), slightly darker than before. A lot of fine sand with some coarse sand to fine gravel. Several caliche nodules, but no large caliche layers. Noticed a dime-sized piece of shrapnel in sample. No root tubes.
20′ - 22′	Upper 1.3′ of this interval is still compacted light-brown silt with fine sand. The lower 0.7′ is a mixture of light-brown silt with coarse dark-gray and black sand with small limestone gravel as large as large as 5 mm. Also a hard caliche layer 0.1′ thick at 21.8′.

Table 2.2.2.3.--Lithologic log of core from hole OB/CD-03 Melrose Air Force Range, NM

Depth interval below land surface (feet)		Lithologic description
0		
1		0' - 1' Moderate-brown (5 YR 4/4) silt, lightly compacted with some fine sand and trace of small gravel (limestone and quartz), subrounded to subangular. Plant roots throughout.
2		1' - 2' Light-brown (5 YR 5/4) moderately compacted silt, about 10% randomly "speckled" with white nodules or small bands of caliche. Some fine sand, no gravel. Root zones throughout.
3		2' - 4' Moderate orange-pink (5 YR 8/4) silt with some fine- to very fine-grained sand. About 30% is white banded but very few separate nodules. Root tubes throughout. No gravel.
4		
5		4' - 7' Light-brown (5 YR 6/4) silt with some very fine- to fine-grained sand. Moderately compacted with small amount of white nodules (calcification) and irregular light-colored bands. Small number of small limestone nodules. Root tubes throughout (no gravel).
6		
7		
8		7' - 9' Light-brown silt and very fine sand similar to previous interval, only a half-shade darker in color, probably due to decrease overall in calcification. Still a few white calcite nodules. Traces of very hard sandstone. Root tubes throughout. No gravel.
9		
10		
11		9' - 12' Light-brown silt and fine-grained sand as above (somewhere between 5 YR 6/4 and 5 YR 8/4). Slight increase in small calcite nodules and lighter irregularly shaped zones. Slight trace of small gravel, mostly limestone, some quartz (quartz is well rounded.) Root tubes.
12		
13		12' - 14' Light-brown (5 YR 6/4) silt and very fine-grained sand similar to previous intervals. Slightly more compaction than before. Only trace of small calcite nodules and lighter colored irregularly shaped zones. No gravel, small amount of pale-brown (5 YR 5/2) clay at about 13 feet. Root tubes throughout.
14		
15		14' - 16' Light-brown silt and very fine-grained sand, similar to previous interval, only has small color variations (lighter/darker) throughout interval. Small amount of white calcite nodules. Trace of gravel (mostly subrounded to subangular limestone fragments - generally very small). Root tubes throughout.
16		

During June 3-7, 1993, two exploratory holes were drilled in the northeast corner of the OB/OD. The first hole was drilled with air to a maximum depth of 180 feet. The purpose of this hole was to reach the Ogallala aquifer if possible and to determine the presence of any perched water zones. The Ogallala aquifer was not reached but a small perched zone was penetrated at a depth of 94 to 100 feet. The first hole was plugged with bentonite. A second hole was drilled using the mud-rotary method. This second hole was continuously cored to a depth of 120 feet and completed as a monitoring well. Table 2.2.2.4 is a description of the materials penetrated in the cored hole, hereafter referred to as MW-1. Figure 2.2.2.1 is a well-completion diagram showing the construction features of MW-1.

The lithology of MW-1 shows similar material in the upper 20 feet as found in other holes. The material becomes coarser below 25 feet with sand and pebble material. Below 57 feet, most of the material is cemented and has very little carbonate material compared to the upper section. This lower section is assumed to be the Ogallala Formation.

2.2.3 Analytical results and comparison to action levels

Soil samples were collected during two time frames for this project. The first samples were collected while coring the 20-foot holes OB/OD-01, 02, and 03. Samples were collected from these holes at depths of 0, 5, and 10 feet and analyzed for explosives by the High Pressure Liquid Chromatography (HPLC) method, SW6010 metals, antimony (furnace method), and selenium (furnace method). No explosives residue was found in any of the samples. The only metal analyzed that exceeded the RCRA action levels was beryllium. Table 2.2.3.1 is a listing of beryllium values obtained from the first sampling of OB/OD. Analytical lab sheets for metals analysis are found in Appendix A, analytical lab sheets for explosives analysis are found in Appendix B, and all Quality Control (QC) results are found in Appendix C.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM

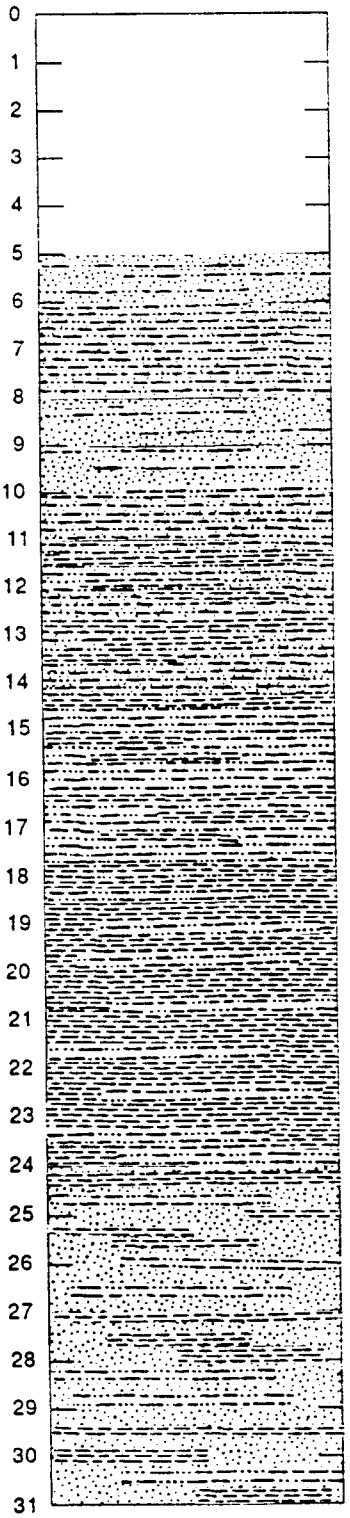
Depth interval below land surface (feet)	Lithologic description
	
0 - 5′	No samples retained.
5′ - 6′	(Cuttings) Sandy silt with clay and caliche nodules; sand very fine to medium grained; light brown (5 YR 5/6); strong reaction with HCl; caliche nodules 60%, ≤ 20 mm.
6′ - 7′	(Cuttings) Silty sand with caliche and minor pebbles; sand very fine to fine-grained, pebbles <5%, <10 mm, subangular; pebbles limestone, sandstone, quartz; light brown (5 YR 5/6), strong reaction with HCl; caliche occurs as matrix and nodules < 10 mm.
7′ - 8′	(Cuttings) Silty sand with caliche and minor pebbles; sand very fine to fine grained; pebbles <5%, <10 mm, subangular; pebbles limestone, sandstone, quartz; light brown (5 YR 5/6), strong reaction with HCl; caliche occurs as matrix and nodules <10 mm.
8′ - 9′	(Cuttings) Sandy silt with clay; sand very fine to fine grained; moderate brown (10 YR 4/6), strong reaction with HCl.
9′ - 10′	(Cuttings) Sandy silt with clay; sand very fine to fine grained; light brown (5 YR 5/6), strong reaction with HCl.
10′ - 11′	(Cuttings) Silty sand with clay; sand very fine to fine grained; with 5% medium grained; moderate reddish brown (10 YR 4/6); strong reaction with HCl.
11′ - 18′	Clayey silt with sand; sand very fine to fine grained to medium grained; in lower portion, arkosic; light brown (5 YR 5/6); moderately compacted; weakly cemented with $CaCO_3$, strong reaction with HCl; fairly abrupt basal contact.
18′ - 24′	Silty clay, similar to previous interval. Contains 0.5- to 1-mm-diameter root holes and 1 mm flakes of irridescent bluish-black Mn-oxide? (weakly magnetic).
24′ - 31′	Sand with silt and clay; sand very fine to fine grained in upper portion; very fine to medium grained in lower portion, sand-quartz; moderate yellowish brown (10 YR 5/4), moderately compacted, weakly cemented with $CaCO_3$, strong reaction with HCl; contains root holes and Mn flakes in upper portion; basal contact consists of a 40-mm (?) silty limestone lens; hard, difficult to break with hammer.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Continued

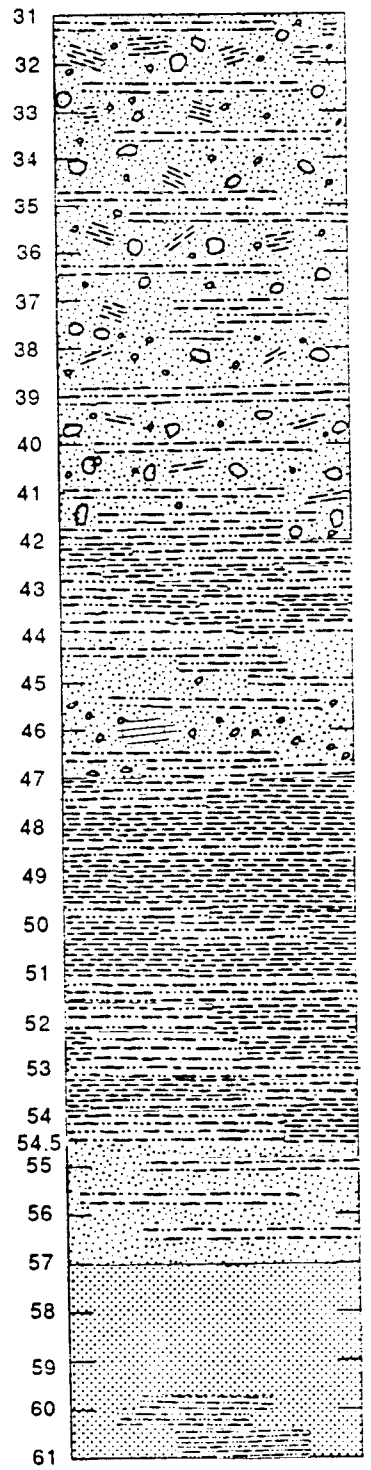
Depth interval below land surface (feet)	Lithologic description
	
31 - 42	Sand with silt and minor silty clay clumps and also pebbles with cobbles; sand very fine to medium grained; pebbles 25%, 15 to 60 mm, subangular to subrounded; cobble 100 mm (terminated by coring), subangular; pebbles and cobble limestone; light brown (5 YR 5/6), clumps moderately/firmly compacted; strong reaction with HCl.
42 - 44	Clayey silt with sand; sand very fine grained, arkosic; light brown (5 YR 5/6), contains root holes and Mn flakes moderately compacted, moderately to strongly cemented with $CaCO_3$, strong reaction with HCl.
44 - 47	Silty sand grading downward to silty sand with pebbles, sand very fine to fine-grained with <1% coarser whole pebbles, pebbles <2% subangular to rounded, mostly <8 mm with few to 12 mm, scattered, except at basal contact; sand-quartz, pebbles-quartz, chert, limonite; reddish brown, moderately compacted, minor root holes, moderately to strongly cemented with $CaCO_3$, strong reaction with HCl; abrupt basal contact includes 30-mm limestone ($CaCO_3$) blob with regular horizontal and irregular near horizontal laminae, also dendritic.
	TOP OF ROCK
47 - 54.5	Silty clay and clayey silt, moderate-reddish-brown (10 YR 4/5); moderately/strongly compacted, moderately to strongly cemented with $CaCO_3$, strong reaction with HCl, upper portion contains $CaCO_3$-rich blobs, also major clayey blobs, greenish gray (5 GY 6/1), with moderate/strong reaction with HCl in lower portion of interval.
54.5 - 57	Silty sand; sand very fine grained, well sorted, moderate reddish brown (10 YR 4/5), moderately laminated <1 mm moderately compacted, strongly cemented, no reaction to moderate/strong reaction with HCl where calcareous; gradual basal contact.
	TOP OF SOUND ROCK
57 - 61	Sandstone with siltstone in lower central portion; sand very fine grained, clayey in lower portion, well sorted, micaceous in upper portion; moderate brown (5 YR 4/4), poorly to well laminated <1 mm to 3 mm; moderately hard, readily scratches with knife, no reaction with HCl.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Continued

Depth interval below land surface (feet)	Lithologic description
61 - 70.5	Sandstone, very fine to fine-grained, upper and lower 1' pale-greenish-yellow (10 YR 8/2), otherwise grayish-brown (5 YR 3/2), massive to laminated, moderately cemented, scratches with knife, no reaction with HCl.
70	Mudstone/shale, poorly defined 0.1-0.2' zone, irregular, moderate-brown (5 YR 4/4).
70.5 - 71	Siltstone, shalev: micaceous, moderate brown (5 YR 4/4), poor fissility, no reaction with HCl.
71 - 77	Sandstone, very fine to fine-grained; arkose; grayish brown (5 YR 3/2), massive to laminated; poorly cemented, scratches with fingernail when wetted; no reaction with HCl, blebby basal contact.
77 - 77.5	Shale, silty and sandy; sand very fine grained, arkosic, moderate brown (5 YR 4/4), poor fissility, irregular near-horizontal fracture in upper portion and 15 degrees (from horizontal) planar slicken-sided surface are Fe stained; no reaction with HCl.
77.5 - 82	Sandstone; very fine to fine or medium grained in lower central portion; grayish brown (5 YR 3/2); massive to laminated, weakly cemented, scratches with fingernail when wetted; no reaction with HCl.
82 - 85.2	Mudstone/shale; moderate brown (5 YR 4/4); irregular, near-horizontal weak fissility; weak reaction with HCl; basal contact is abrupt 50 degrees near-planar slicken-side with Fe stains.
85.2 - 85.5	Mudstone with volcanic ash (?), contains 10 to 20% silt and very fine to fine-grained sandstone, including glassy material; greenish gray (5 GY 6/1); poorly cemented, easily scratched when wetted; weak reaction with HCl; basal contact is abrupt and irregular.
85.5 - 95	Mudstone and shale; greenish gray (5 GY 6/1); poor to moderately developed fissility, dissolves in water, few scattered slicken-sides and minor near-vertical hairline fractures are Fe stained; weak reaction with HCl.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Base, NM--Continued

Depth interval below land surface (feet)	Lithologic description
95 - 105	95′ - 105′ Sandstone, very fine to fine- or medium-grained; greenish gray (5 GY 6/1); 97- to 100′-zone recovered crumbly (reported to be water bearing), small pieces easily crushed when wetted, no to weak reaction with HCl.
105 - 107	105′ - 107′ Mudstone, greenish-gray (5 GY 6/1).
107 - 119	107′ - 119′ Mudstone, very silty, and siltstone, moderate-brown (5 YR 4/4), soft, easily scratched with knife, very weak reaction with HCl.
119 - 120.2	119′ - 120.2′ Sandstone, very fine to fine-grained: grayish green (5 GY 6/1) to grayish brown (5 YR 3/2); massive, moderately hard, scratches with knife.
120.2 - 125	120.2′ - 125′ (Cuttings) Shale, silty; moderate brown (5 YR 4/4) and greenish gray (5 GY 6/1); no reaction with HCl.

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Continued

Depth interval below land surface (feet)	Lithologic description
125	
126	
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130	
131	
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136	125' - 150' (Cuttings) Shale, silty; moderate brown (5 YR 4/4) and greenish gray (5 GY 6/1); no reaction with HCl.
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152	150' - 155' (Cuttings) Mudstone/shale; brownish-gray (5 YR 4/1), cuttings difficult to break with fingernail when dry, dissolves when wetted, no reaction with HCl.
153	
154	
155	

Table 2.2.2.4.--Lithologic log of monitoring well MW-1 Melrose Air Force Range, NM--Concluded

Depth interval below land surface (feet)	Lithologic description
155	
156	
157	
158	
159	
160	
161	155′ - 165′ (Cuttings) Shale and silty shale: greenish gray (5 GY 6/1), cuttings difficult to break with fingernail when dry, dissolves when wetted, no reaction with HCl.
162	
163	
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171	
172	165′ - 180′ (Cuttings) Sandstone with siltstone and shale, very fine to fine-grained, greenish-gray (5 GY 4/1), small pieces easily crushed with fingers when wetted (except for well-indurated shale); no reaction with HCl.
173	
174	
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180	

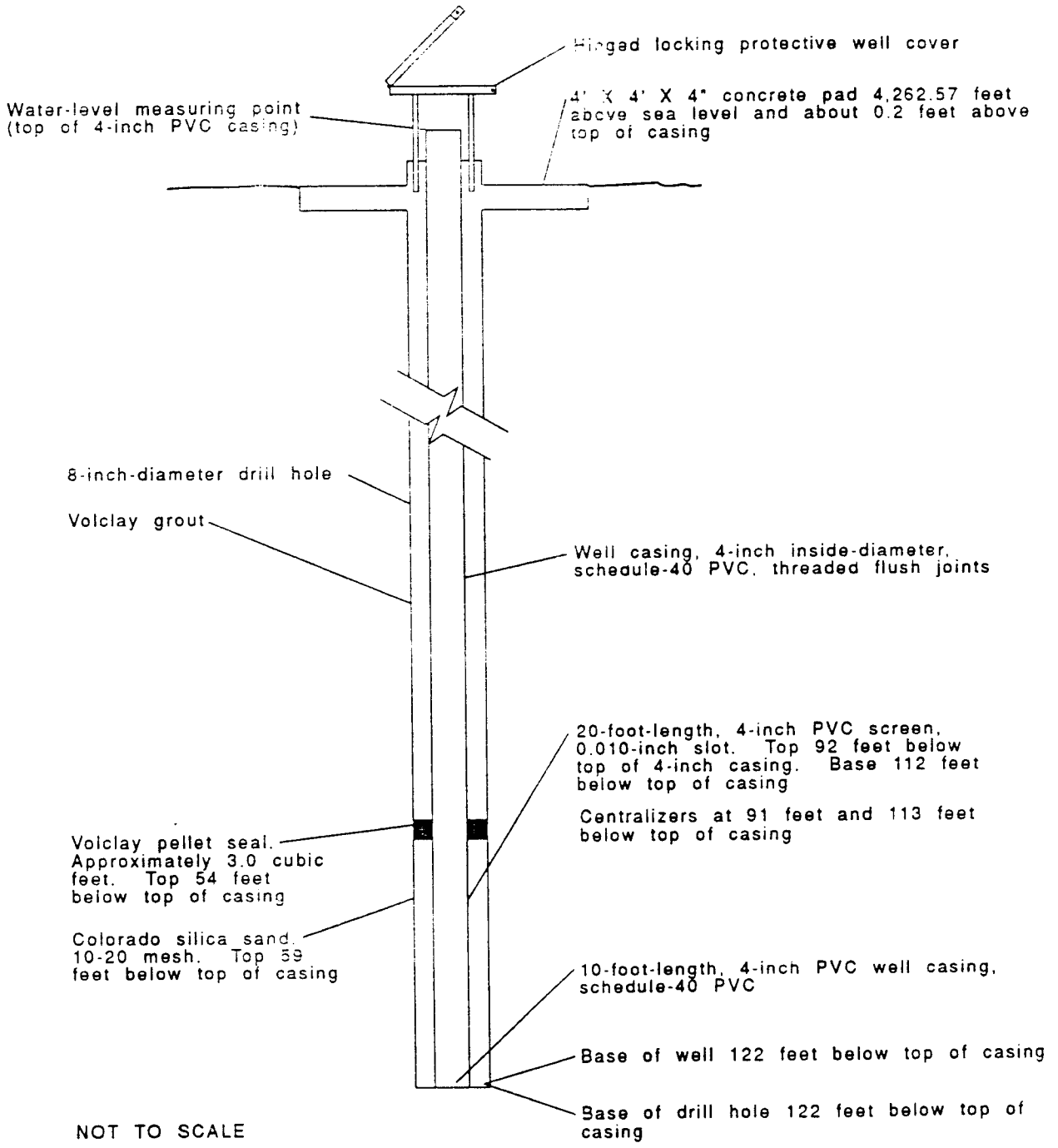

Figure 2.2.2.1.--Well-completion diagram for monitoring well 1MW-1. Drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started 06-03-93. Completed 06-07-93. Well drilled using mud-rotary method and Wyoming sodium bentonite drilling fluid.

Table 2.2.3.1.--Beryllium values obtained from holes OB/OD-01, 02, and 03 Melrose Air Force Range, New Mexico

Well and sample number	Depth (feet)	RCRA action level (mg/kg)	Reporting level (mg/kg)	Beryllium concentration (mg/kg)
OB/OD0101	0-1	0.2	0.20	0.60
OB/OD0102	5	0.2	0.20	0.34
OB/OD0103	10	0.2	0.40	0.47
OB/OD0201	0-1	0.2	0.20	0.56
OB/OD0202	5	0.2	0.20	0.54 (duplicate)
OB/OD0203	5	0.2	0.40	Not detected
OB/OD0204	10	0.2	1.00	Not detected
OB/OD0301	0-1	0.2	0.20	0.49
OB/OD0304	5	0.2	0.20	0.35
OB/OD0305	10	0.2	0.20	0.55

The second series of soil samples were taken June 6-8, 1993. The samples were collected at depths of 0 and 5 feet from three boreholes west of the OB/OD for background, three boreholes around the perimeter of the bermed area, and eight boreholes around the center of the site. Figure 2.2.1.2 shows the location of the additional sampling sites. Sampling protocol for metals was the same as that for the previous sampling. At the request of the New Mexico Environment Department (NMED), explosives analysis was done by Method SW 8330. No explosives residue was reported in any analyses. Beryllium was found at levels above the RCRA action levels. Table 2.2.3.2 is a listing of beryllium values from this second series of soil sampling. Analytical lab sheets for metals analyses are found in Appendix A, analytical lab sheets for explosives analyses are found in Appendix B, and all Quality Control (QC) results are found in Appendix C.

Table 2.2.3.2.--Beryllium values obtained from holes OB/OD-04 through OB/OD-14 Melrose Air Force Range, New Mexico

Well and sample number	Depth (feet)	RCRA action level (mg/kg)	Reporting level (mg/kg)	Beryllium concentration (mg/kg)
OB/OD0401	0-1	0.20	0.20	0.64
OB/OD0402	5	0.20	0.20	0.47
OB/OD0501	0-1	0.20	0.20	0.62
OB/OD0502	5	0.20	0.20	0.35
OB/OD0601	0-1	0.20	0.20	0.69
OB/OD0602	5	0.20	0.20	Not detected
OB/OD0701	0-1	0.20	0.20	0.60
OB/OD0702	5	0.20	0.20	0.67
OB/OD0801	0-1	0.20	0.20	0.62
OB/OD0802	0-1	0.20	0.20	0.39 (duplicate)
OB/OD0803	5	0.20	0.20	0.45
OB/OD0901	0-1	0.20	0.20	0.57
OB/OD0902	5	0.20	0.20	0.38
OB/OD1001	0-1	0.20	0.20	0.46
OB/OD1002	5	0.20	0.20	0.37
OB/OD1101	0-1	0.20	0.20	0.58
OB/OD1104	5	0.20	0.20	0.32
OB/OD1201	0-1	0.20	0.20	0.27
OB/OD1202	5	0.20	0.20	0.43
OB/OD1301	0-1	0.20	0.20	0.39
OB/OD1302	5	0.20	0.20	0.35
OB/OD1401	0-1	0.20	0.20	0.52
OB/OD1402	5	0.20	0.20	0.44

2.2.4 Summary and conclusions

During May 4 through June 8, 1993, 14 shallow soil borings and two exploratory holes were drilled on or near the OB/OD on MAFR. Three of the shallow soil borings were continuously cored to depths of nearly 20 feet to characterize the subsurface geology and analytical content. These borings were analyzed for metals and explosives at depths of 0, 5, and 10 feet. Eleven shallow soil borings were drilled to collect additional soil samples at depths of 0 and 5 feet. Two exploratory holes were drilled in the northeast corner of the OB/OD. The first well was drilled with air to 180 feet to determine the location of water zones. This hole was then plugged with Bentonite. The second well was drilled using the mud-rotary method and continuously cored to a depth of 120 feet and completed as a monitoring well across a perched water zone from 94 to 100 feet.

The geology of the site is mostly silt and very fine sand in the upper 25 feet that becomes slightly coarser to a depth of 27 to 57 feet. Below 57 feet the core hole material becomes cemented and noncalcareous, indicating the top of the Ogallala Formation.

Analytical results of the soil sampling showed no explosives residue in the soils. The only metal exceeding action levels was beryllium. Beryllium values were high in background samples and are naturally high throughout much of New Mexico. The action levels for beryllium is 0.20 milligram per kilogram. Values obtained from the OB/OD site ranged from nondetected to 0.69 milligram per kilogram.