Department of Energy
Field Office, Albuquerque
Los Alamos Area Office
Los Alamos, New Mexico 87544

JUN 27 1995

RECEIVED
HAZARDOUS WASTE
PROGRAM
1995

TA 16

Benito Garcia, Chief
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
525 Camino de los Marquez
P. O. Box 26110
Santa Fe, NM 87502

Dear Mr. Garcia:

Subject: LANL TA-16 RCRA Part B Permit Application

The purpose of this letter is to submit the enclosed RCRA Part B Permit Application for Technical Area 16: Building 88 Container Storage Area, Flash Pad 387 open burn unit, Burn Pads 388 and 399 open burn units, Burn Tray 394 open burn unit, and Filter Vessels 401 and 406 open burn units. This submittal is in response to your request to provide the application by June 30, 1995.

Should you have any questions, please contact Jody Plum at (505) 665-5042.

Sincerely,

Larry Kirkman, P.E.
Acting Area Manager

LAAMEP:8JP-002

Enclosure

5973

RCRA Part B Permit Application
Volume I

Technical Area 16

Building 88, Container Storage Area
Flash Pad 387, Open Burn Unit
Burn Pads 388 and 399, Open Burn Units
Burn Tray 394, Open Burn Unit
Filter Vessels 401 and 406, Open Burn Units

Prepared by:
Los Alamos National Laboratory
Hazardous and Solid Waste Group (ESH-19)
Los Alamos, New Mexico 87545

June 1995

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LIST OF ABBREVIATIONS/ACRONYMS

AASHTO	American Association of State Highway Transportation Officials
AEHA	U.S. Army Environmental Hygiene Agency
amsl	above mean sea level
AQCR	Air Quality Control Regulation
"AR"	action required
BEP	building emergency plan
BTU	British Thermal Units
CAS	Central Alarm Station
CFR	Code of Federal Regulations
cm	centimeters
cm/hr	centimeters/hour
cm/cm	centimeters/centimeters
CO	carbon monoxide
CO_2	carbon dioxide
CST	LANL's Chemical Science and Technology Division
CST-7	LANL's Environmental Systems and Waste Characterization Group
CST-9	LANL's Inorganic Trace Analysis Group
DA	deferred action
DMSO	dimethylsulfoxide
DOE	U.S. Department of Energy
DOE/LAAO	DOE's Los Alamos Area Office
DX	LANL's Dynamic Experimentation Division
DX-16	LANL's Explosives Technology and Safety Group
EA	LANL's Engineering Analysis Group

LIST OF ABBREVIATIONS/ACRONYMS
(Continued)

EDS	Employee Development System
EM&R	Emergency Management and Response
EMP	Emergency Management Plan
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ESA	LANL's Engineering Sciences and Applications Division
ESA-WMA	LANL's Engineering Sciences and Applications -Weapons Materials Applications Group
ES&H	Environment, Safety, and Health
ESH	LANL's Environment, Safety, and Health Division
ESH-1	LANL's Health Physics Operations Group
ESH-2	LANL's Occupational Medicine Group
ESH-5	LANL's Industrial Hygiene and Safety Group
ESH-7	LANL's Occurrence Investigation Group
ESH-10	LANL's Hazardous Materials Response Group
ESH-13	LANL's ES&H Training Group
ESH-17	LANL's Air Quality Group
ESH-18	LANL's Water Quality and Hydrology Group
ESH-19	LANL's Hazardous and Solid Waste Group
ESH-20	LANL's Environmental Assessments and Resource Evaluations Groups
°F	degrees Fahrenheit

LIST OF ABBREVIATIONS/ACRONYMS
(Continued)

FSS	LANL's Facilities, Security, and Safeguards Division
FSS-20	LANL'S EM&R Office
ft	foot or feet
ft/yr	feet per year
GET	General Employee Training
gpm	gallons per minute
HAP	hazardous air pollutant
HAZMAT	hazardous materials
HDPE	high-density polyethylene
HE	high-explosive
HMGS	Hazardous Materials Group Supervisor
HMX	cyclotetramethylenetetramine
hr	hour
HSWA	Hazardous and Solid Waste Amendments
HWF	Hazardous Waste Facility
IC	Incident Commander
ICG	Incident Control Group
IRF	Inspection Record Form
IWP	Installation Work Plan
JCI	Johnson Controls World Services, Inc.
LAAO	DOE's Los Alamos Area Office
LACFD	Los Alamos County Fire Department
LACPD	Los Alamos County Police Department

LIST OF ABBREVIATIONS/ACRONYMS
(Continued)

LAMC	Los Alamos Medical Center
LANL	Los Alamos National Laboratory
lb	pound(s)
LDR	land disposal restrictions
MDA-P	Material Disposal Area P
MOU	memorandum of understanding
mph	miles per hour
m/s	meters per second
MSDS	material safety data sheet
NAWAS	National Warning System
20 NMAC 4.1	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
NMED	New Mexico Environment Department
NMT	LANL's Nuclear Materials Technology Division
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
OB	open burning
OJT	on-the-job training
OSHA	Occupational Safety and Health Administration
PA	public address
PETN	pentaerythritol tetranitrate
PM	particulate matter
PPE	personal protective equipment
PTLA	Protection Technology Los Alamos

LIST OF ABBREVIATIONS/ACRONYMS
(Continued)

QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	cyclonite
RFI	RCRA Facility Investigation
SM-409	ESH-2's Central Medical Facility
SOP	standard operating procedure
SW-846	EPA's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"
SWMU	solid waste management unit
TA	technical area
TATB	triaminotrinitrobenzene
TNT	trinitrotoluene
TSD	treatment, storage, or disposal
UCC	Utilities Control Center
VOC	volatile organic compound
WAP	Waste Analysis Plan
WPF	Waste Profile Form
yd^3	cubic yard

1.0 INTRODUCTION AND REVISED PART A PERMIT APPLICATION

This permit application is submitted to the New Mexico Environment Department and to the U.S. Environmental Protection Agency (EPA), Region 6, to meet the requirements of the Resource Conservation and Recovery Act (RCRA), the New Mexico Hazardous Waste Act, and implementing regulations.

This Part B permit application addresses the following waste units at Los Alamos National Laboratory (LANL):

- One flash pad, designated TA-16-387, for burning high explosives (HE)-contaminated equipment/materials.
- Two burn pads, designated TA-16-388 and TA-16-399, for burning HE solids.
- One burn tray, designated TA-16-394, for burning HE-contaminated oil/solvent mixtures.
- Two filter vessels, designated TA-16-401 and TA-16-406, for burning HE-contaminated sludges.
- One container storage area at Building 88, designated TA-16-88, for storage of hazardous and low-level mixed waste.

The content of the Part B permit application follows the guidance provided in "RCRA Part B Permit Writers Guidance Manual for Department of Defense Open Burning/Detonation Units" (U.S. Army Environmental Hygiene Agency [AEHA], 1987). An outline of the permit application with the citations of the regulations covered by each section is shown in Table 1-1.

LANL is also including a revised Part A permit application for hazardous and mixed waste pursuant to the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart IX, 270.72 and guidance from the Radioactive and Hazardous Waste Bureau. This revised Part A permit application includes all of the general facility information that is required in a Part A permit application; however, the only unit-specific information is for the hazardous and mixed waste treatment and storage units at TA-16, listed above. These units were previously identified in LANL's "RCRA Part A Permit Application for Mixed Waste", January 1991 (LANL, 1991) and LANL's "RCRA Part B Permit Application", Revision 4.1, November 1988 (LANL, 1988), which includes the Part A permit application for hazardous waste. This Part A permit application is included in this section as Attachment 1-1, and is referred to in the Part B permit application as the "TA-16 Part A permit application."

LANL is a multidisciplinary laboratory (EPA No. NM0890010515) owned by the U.S. Department of Energy (DOE), and operated jointly by DOE and the University of California. The principal mission of LANL is the design and development of weapons for the nation's nuclear arsenal; however, considerable research and development is directed toward the development of the peaceful uses of nuclear energy including research on controlled thermonuclear reactions, fission reactors, nuclear safeguards, laser fusion, and medium-energy physics. Extensive basic research in physics, chemistry, metallurgy, mathematics and computers, earth sciences, and electronics supports these efforts. Biomedical and environmental research includes programs in molecular biology, radiobiology, cancer therapy, radiology, and industrial hygiene.

An outline of the permit application with citations of the regulations covered by each section is given in Table 1-1. All regulatory citations in this application reference 20 NMAC 4.1, which incorporates, with a few minor exceptions, Title 40 of the Code of Federal Regulations, Parts 260-270.

Table 1-1

Regulatory References and Corresponding Permit Application Location

RCRA[a] Regulatory Reference 20 NMAC 4.1, Subpart IX[b] (40 CFR, Part 270)	20 NMAC 4.1, Subpart V (40 CFR, Part 264)	Description of Requirement	Location in Permit Application
270.10(a)	--	Permit application	1.0
270.10(g)(1)	--	Updating permit applications	1.0
270.11(a)	--	Signatories	12.0
270.11(d)	--	Certification	12.0
270.13	--	Contents of Part A permit application	Part A
270.13(a)	--	Activities conducted	Part A
270.13(b)	--	Name, mailing address, and location	Part A
270.13(c)	--	Principal SIC codes	Part A
270.13(d)	--	Operator information	Part A
270.13(e)	--	Owner information	Part A
270.13(f)	--	Whether located on Indian land	Part A
270.13(g)	--	New or existing facility	Part A
270.13(h)	--	Scale drawing and photographs	Part A
270.13(i)	--	Description of waste processes	Part A
270.13(j)	--	Specification, quantity hazardous waste	Part A
270.13(k)	--	List of permits and construction approved	Part A
270.13(l)	--	Topographic maps	Part A
270.13(m)	--	Description of nature of business	Part A
270.14(b)(1)	--	General facility description	2.0
270.14(b)(2)	264.13(a)	Chemical and physical analyses	3.0
270.14(b)(3)	264.13(b)	Waste analysis plan	3.0
	264.13(b)	Parameters and rationale	3.0
	264.13(b)	Test methods	3.0
	264.13(b)	Sampling methods	3.0
	264.13(b)	Frequency of analyses	3.0
270.14(b)(4)	264.14	Security procedures and equipment	5.1
270.14(b)(5)	264.15(b)	Inspection requirements	6.0

Refer to footnotes at end of table.

Table 1-1 (Continued)

Regulatory References and Corresponding Permit Application Location

RCRA[a] Regulatory Reference 20 NMAC 4.1,[b] Subpart IX (40 CFR, Part 270)	20 NMAC 4.1, Subpart V (40 CFR, Part 264)	Description of Requirement	Location in Permit Application
	264.174	Inspections	6.2
270.14(b)(7)	264 Subpart D	Contingency plan	7.0
	264.51	Contingency plan design and implementation	7.0 and 7.3.1
	264.52	Contingency plan content	7.0
	264.53	Contingency plan copies	7.1
	264.54	Contingency plan amendment	7.13
	264.55	Emergency coordinator	7.1.1
	264.56	Emergency procedures	7.3 -7.12
270.14(b)(8)	264 Subpart C	Preparedness and prevention	5.2
	264.31	Design and operation of facility	5.0
	264.32	Required equipment	5.2 and 5.3
	264.33	Testing and maintenance of equipment	5.2
	264.34	Communications/alarm system	7.2
	264.35	Required aisle space	5.2.4
	264.37	Arrangements with local authorities	5.5, 7.1.5, and 7.1.7
270.14(b)(9)	264.17	Prevention of accidental ignition or reaction	5.4
270.14(b)(10)	--	Traffic pattern, volume, and controls	2.3
270.14(b)(11)(i) & (ii)	264.18(a)	Seismic standard	2.2.1
270.14(b)(11)(iii)	264.18(b)	Floodplain standard	2.2.2
270.14(b)(12)	264.16	Personnel training	8.0
270.14(b)(13)	264 Subpart G	Closure and post-closure plans	9.0
	264.111	Closure performance standard	9.1.1
	264.112(a) & (b)	Written content of closure plan	9.2 -9.4
	264.112(c)	Amendment of closure plan	9.1.4
	264.112(d)	Notification of partial and final closure	9.1.2

Refer to footnotes at end of table.

Table 1-1 (Continued)

Regulatory References and Corresponding Permit Application Location

RCRA[a] Regulatory Reference 20 NMAC 4.1,[b] Subpart IX (40 CFR, Part 270)	20 NMAC 4.1, Subpart V (40 CFR, Part 264)	Description of Requirement	Location in Permit Application
	264.112(e)	Removal of wastes and decontamination/dismantling of equipment	9.2 and 9.3
	264.113	Time allowed for closure	9.1.3
	264.114	Disposal/decontamination	9.2 and 9.3
	264.115	Certification of closure	9.1.6
	264.117	Post-closure care and use of property	9.1.10
	264.120	Certification of post-closure	9.1.10
	264.178	Closure of containers/storage areas	9.2
270.14(b)(19)(i)(vi) (vii) & (x)	--	Topographic maps	2.1.3
270.14(b)(19)(ii)	264.18(b)	100-year floodplain	2.2.2
270.14(b)(19)(iii)	--	Surface waters	2.1.4
270.14(b)(19)(iv)	--	Land use	2.1.6
270.14(b)(19)(v)	--	Wind rose	2.1.5
270.14(b)(19)(viii)	264.14(b)	Access control	5.1
270.14(b)(19)(ix)	--	Wells	2.1.4
270.14(b)(19)(xi)	--	Drainage barriers	5.3
270.14(b)(19)(xii)	--	Location of operational units	2.1
270.14(b)(20)	--	Other federal laws	11.0
270.14(c)	264.90(a)	Ground-water monitoring	2.2.5
270.14(d)(1)	--	Requirements for solid waste management units (SWMU)	10.0
270.14(d)(1)(i)	--	Location of SWMUs on topographic map	Figures 10-1 and 10-2
270.14(d)(1)(ii)	--	Types of SWMUs	10.1
270.14(d)(1)(iii)	--	Structural description of SWMUs	10.1 and Attachment 10-1
270.14(d)(1)(iv)	--	Dates of operation	10.1 and Attachment 10-1

Refer to footnotes at end of table.

Table 1-1 (Continued)

Regulatory References and Corresponding Permit Application Location

RCRA[a] Regulatory Reference 20 NMAC 4.1,[b] Subpart IX (40 CFR, Part 270)	20 NMAC 4.1, Subpart V (40 CFR, Part 264)	Description of Requirement	Location in Permit Application
270.14(d)(1)(v)	--	Waste types managed at SWMU	10.1 and Attachment 10-1
270.15	264 Subpart I	Containers	4.1
270.15(a)	264.175	Containment system	4.1
270.15(b)	264.175(c)	Free liquids	4.1 and 4.2
270.15(c)	264.176	Ignitable or reactive wastes	4.1, 4.2, and 5.4
270.15(d)	264.177	Incompatible wastes	4.1, 4.2, and 5.4
270.23	264 Subpart X	Miscellaneous units	4.0
270.23(a)	--	Detailed unit description	4.1, 4.3 - 4.6
270.23(b)	264.601	Hydrologic, geologic, and meteorologic assessments	2.0 and 4.7
270.23(c)	264.601	Potential exposure pathways	4.7
270.23(d)	--	Demonstration of treatment effectiveness	4.0

[a] Resource Conservation and Recovery Act.

[b] The New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), adopts, with a few limited exceptions, Title 40 of the Code of Federal Regulations (40 CFR), Parts 260-266, Part 268, and Part 270 (1993). 20 NMAC 4.1, Subparts V and IX, contain equivalent regulations to 40 CFR Parts 264 and 270, respectively.

ATTACHMENT 1-1

REVISED PART A PERMIT APPLICATION
FOR HAZARDOUS AND MIXED WASTE UNITS AT TECHNICAL AREA 16

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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	B. Secondary ID Number *(if applicable)*
N M 0 8 9 0 0 1 0 5 1 5	

II. Name of Facility

LOS ALAMOS NATIONAL LABORATORY

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

A. Street

Street *(continued)*

City or Town	State	ZIP Code
LOS ALAMOS		-

County Code *(if known)*	County Name
028	LOS ALAMOS

B. Land Type	C. Geographic Location		D. Facility Existence Date
(enter code)	*LATITUDE (degrees, minutes, & seconds)*	*LONGITUDE (degrees, minutes, & seconds)*	Month Day Year
F	35 49 051	106 14 015	11 25 1942

IV. Facility Mailing Address

Street or P.O. Box

P.O. BOX 1663

City or Town	State	ZIP Code
LOS ALAMOS	NM	87545 -

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

Name *(last)*	*(first)*
VOZELLA	JOSEPH

Job Title	Phone Number *(area code and number)*
AST. AREA MANAGER	505-665-5027

VI. Facility Contact Address *(See instructions)*

A. Contact Address Location	Mailing	B. Street or P.O. Box
	X	528 35TH STREET

City or Town	State	ZIP Code
LOS ALAMOS	NM	87544 -

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GSA No. 0246-EPA-C

EPA I.D. Number (enter from page 1)	Secondary ID Number (enter from page 1)
NM089000105 15	

VII. Operator Information (see instructions)

Name of Operator			
UNIVERSITY OF CALIFORNIA			
Street or P.O. Box			
P.O. BOX 1163			
City or Town	**State**	**ZIP Code**	
LOS ALAMOS	NM	87545 -	

Phone Number (area code and number)	B. Operator Type	C. Change of Operator Indicator	Date Changed Month	Day	Year
505-667-5061	F	Yes ☐ No X			

VIII. Facility Owner (see instructions)

A. Name of Facility's Legal Owner			
U.S. DEPARTMENT OF ENERGY			
Street or P.O. Box			
528 35TH STREET			
City or Town	**State**	**ZIP Code**	
LOS ALAMOS	NM	87544 -	

Phone Number (area code and number)	B. Owner Type	C. Change of Owner Indicator	Date Changed Month	Day	Year
505-667-5061	F	Yes ☐ No X			

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

Primary		Secondary	
	(description) NATIONAL SECURITY		(description)
Secondary		**Secondary**	
	(description)		(description)

X. Other Environmental Permits (see instructions)

A. Permit Type (enter code)	B. Permit Number	C. Description
	NMR00A384	NPDES STORM WATER GENERAL PERMIT
	NM0028355	NPDES OUTFALL PERMIT
	NM0028576	NPDES (Geothermal Site)
	NM089000105 15	RCRA (Hazardous Waste Permit)
		RAD. NESHAPs Preconstr. Approvals:
		Low Level Waste/Mixed Waste Incin.
		Dual Axis Radiographic Hydrotest Fac.
		Ground Test Accelerator
		Independent Management Activity

A. Permit Type	B. Permit Number	C. Description
Rad. NESHAPS preconstruction approvals (continued)		Facility-wide application for existent emissions
		TA-21, D&D Activity
		TA-50, Bldg 83 Mobile Decon Trailer
		TA-54 TRU Retrieval Domes
		STATE AIR QUALITY PERMITS
E	AQCR 301	Open Burning
E		TA-11 Fuel Fire Burn
E		TA-36 HE Contaminated Wood Burning
E		TA-14 HE Contaminated Material Burning
E		TA-16 HE Contaminated Material Burning
E		TA-33 & 39 LIDAR Test Burning
E	AQCR 702	Beryllium Machining
E	#632	TA-35, BLDG 213, Beryllium Machining Emissions
E	#634-M-1	TA-3, BLDG 141, Beryllium Processing Emissions
E	#635	TA-3, BLDG 39, Beryllium Machining Emissions
E	#741	TA-3, BLDG 35, Planned Beryllium Machining Emissions
E	#1081-M-1	TA-55, BLDG 4, Beryllium Machining Emissions
		STATE SEPTIC TANK PERMITS
E	LA-01	State Septic Tank Permit
E	LA-02	State Septic Tank Permit
E	LA-03	State Septic Tank Permit
E	LA-04	State Septic Tank Permit
E	LA-05	State Septic Tank Permit
E	LA-06	State Septic Tank Permit
E	LA-07	State Septic Tank Permit
E	LA-08	State Septic Tank Permit

A. Permit Type	B. Permit Number	C. Description
E	LA-09	State Septic Tank Permit
E	LA-11	State Septic Tank Permit
E	LA-12	State Septic Tank Permit
E	LA-13	State Septic Tank Permit
E	LA-14	State Septic Tank Permit
E	LA-15	State Septic Tank Permit
E	LA-16	State Septic Tank Permit
E	LA-17	State Septic Tank Permit
E	LA-18	State Septic Tank Permit
E	LA-19	State Septic Tank Permit
E	LA-21	State Septic Tank Permit
E	LA-22	State Septic Tank Permit
E	LA-23	State Septic Tank Permit
E	LA-24	State Septic Tank Permit
E	LA-25	State Septic Tank Permit
E	LA-26	State Septic Tank Permit
E	LA-27	State Septic Tank Permit
E	LA-28	State Septic Tank Permit
E	LA-29	State Septic Tank Permit
E	LA-30	State Septic Tank Permit
E	LA-31	State Septic Tank Permit
E	LA-32	State Septic Tank Permit
E	LA-33	State Septic Tank Permit
E	LA-34	State Septic Tank Permit
E	LA-35	State Septic Tank Permit
E	LA-36	State Septic Tank Permit
E	LA-37	State Septic Tank Permit
E	LA-38	State Septic Tank Permit

EPA I. D. Number
NM0890010515
X. Other Environmental Permits

A. Permit Type	B. Permit Number	C. Description
E	LA-39	State Septic Tank Permit
E	LA-42	State Septic Tank Permit
E	LA-43	State Septic Tank Permit
E	LA-44	State Septic Tank Permit
E	LA-45	State Septic Tank Permit
E	LA-46	State Septic Tank Permit
E	LA-47	State Septic Tank Permit
E	LA-48	State Septic Tank Permit
E	LA-49	State Septic Tank Permit
E	LA-50	State Septic Tank Permit
E	LA-51	State Septic Tank Permit
E	LA-52	State Septic Tank Permit
E	LA-53	State Septic Tank Permit
E	LA-54	State Septic Tank Permit
E	LA-55	State Septic Tank Permit
E	LA-56	State Septic Tank Permit
E	LA-57	State Septic Tank Permit
E	LA-58	State Septic Tank Permit
E	LA-59	State Septic Tank Permit
E	LA-60	State Septic Tank Permit
E	LA-61	State Septic Tank Permit
E	LA-124	State Septic Tank Permit
E	SF880257	State Septic Tank Permit
E	SF880258	State Septic Tank Permit
E	SF880259	State Septic Tank Permit
E	SF880260	State Septic Tank Permit
E	SF880261	State Septic Tank Permit
E	SF890023	State Septic Tank Permit

EPA I. D. Number
NM0890010515
X. Other Environmental Permits

A. Permit Type	B. Permit Number	C. Description
E	SF890024	State Septic Tank Permit
E	SF890025	State Septic Tank Permit
E	SF89031R	State Septic Tank Permit
E	SF89032R	State Septic Tank Permit
E	SF89033R	State Septic Tank Permit
E	SF89034R	State Septic Tank Permit
E	SF89035R	State Septic Tank Permit
E	SF89036R	State Septic Tank Permit
E	SF890588	State Septic Tank Permit
E	SF890589	State Septic Tank Permit
E	SF890590	State Septic Tank Permit
E	SF900022	State Septic Tank Permit

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N	M	0	8	9	0	0	1	0	5	1	5												

XI. Nature of Business (provide a brief description)

The principal mission of LANL includes the research, design, development, and analysis of weapons components for the nation's nuclear arsenal. This effort is supported by research programs such as nuclear physics, hydrodynamics, conventional explosives, chemistry, metallurgy, radiochemistry, and biology. In addition to its defense program efforts, LANL supports energy research and environmental missions with programs including medium-energy physics; space nuclear systems; controlled thermonuclear fusion; laser research; environmental research; geothermal, solar, and fossil energy research; nuclear safeguards; biomedical research; and space physics. In 1992, LANL expanded its mission in support of environmental management to include development of new programs in the areas of health and biotechnology, environmental technologies, and industrial partnerships.

This Part ~~A is~~ for the TA-16 Burn Ground including units 387, 388, 399, 394, 401 and 406 and for the Container Storage Area at TA-16/88.

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 biolgical 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

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EPA I.D. Number (enter from page 1)	Secondary ID Number (enter from page 1)
N M 0 8 9 0 0 1 0 5 1 5	

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	S 0 1	275	G	0 0 1	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

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
0 2	T 0 4	40,000	See Att. 1	0 0 1	See Attachment 1 to this Part A.
0 3	T 0 4	1,000	J	0 0 2	See Attachment 1 to this Part A.
0 4	T 0 4	250	E	0 0 1	See Attachment 1 to this Part A.
0 5	T 0 4	1,000	J	0 0 2	See Attachment 1 to this Part A.

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

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

EPA I.D. Number (enter from page 1)	Secondary ID Number (enter from page 1)
N M 0 8 9 0 0 1 0 5 1 5	

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

EPA I.D. Number (enter from Page 1)
NM0890010515

Secondary ID Number (enter from Page 1)

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	D001	2,500	P	S01	T04		
2	D002	*1,000	P	T04			
3	D003	37,000	P	S01	T04		
4	D005	2,500	P	S01	T04		
5	D006	2,500	P	T04			
6	D007	2,500	P	T04			
7	D008	2,500	P	S01	T04		
8	D009	2,500	P	S01	T04		
9	D011	2,500	P	T04			
10	D022	*1,000	P	T04			
11	D028	*1,000	P	T04			
12	D030	*1,000	P	T04			
13	D035	*1,000	P	T04			
14	D038	*1,000	P	T04			
15	END OF DESIGNATOR						
16	F001	10,000	P	T04			
17	F002	75,000	P	T04			
18	F003	150,000	P	T04			
19	F005	15,000	P	T04			
20	END OF DESIGNATOR						
21	K044	20,000	P	T04			
22	K045	2,000	P	T04			
23	K047	500	P	T04			
24	END OF DESIGNATOR						
25	P009	*1,000	P	T04			
26	P065	*1,000	P	T04			
27	P081	*1,000	P	T04			
28	P112	*1,000	P	T04			
29	END OF DESIGNATOR						
30	U003	*1,000	P	T04			
31	U008	*1,000	P	T04			
32	U044	*1,000	P	T04			

EPA I.D. Number (enter from Page 1)
NM0890010515

Secondary ID Number (enter from Page 1)

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)			D. Processes (2) Process Description (If a code is not entered in D(1))
33	U056	*1,000	P	T04			
34	U069	*1,000	P	T04			
35	U105	*1,000	P	T04			
36	U106	5,000	P	T04			
37	U107	5,000	P	T04			
38	U112	*1,000	P	T04			
39	U113	*1,000	P	T04			
40	U118	*1,000	P	T04			
41	U154	1,000	P	T04			
42	U159	1,000	P	T04			
43	U160	*1,000	P	T04			
44	U189	*1,000	P	T04			
45	U213	*1,000	P	T04			
46	U234	*1,000	P	T04			
47	END OF DESIGNATOR						
48							
49							
50							
51							
52							
53							
54							
55							
56							
57							
58							
59							
60							
61							
62							
63							
64							
65							

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GSA No. 0246-EPA-OT

EPA I.D. Number (enter from page 1)	Secondary ID Number (enter from page 1)
N M 0 8 9 0 0 1 0 5 1 5	

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: [signature] Date Signed: 6/28/95

Name and Official Title (type or print)
Larry D. Kirkman, Acting Area Manager for DOE LAAO

Operator Signature: [signature] Date Signed: 6/28/95

Name and Official Title (type or print)
Larry D. Kirkman, Acting Area Manager DOE LAAO / Dennis J. Erickson, Division Director, LANL ESH Div.

XIX. Comments

*All entries with an asterisk in Section XIV Part D are typically generated in volume much less than 500 lbs.

Note: All EPA Hazardous Waste Numbers designated for T04 treatment also contain a D003 component.

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

ATTACHMENT 1

EXPLANATION OF PROCESS CODE LISTINGS AND DESIGN CAPACITIES FOR HAZARDOUS AND MIXED WASTE UNITS

EXPLANATION OF PROCESS CODE LISTINGS AND DESIGN CAPACITIES FOR HAZARDOUS AND MIXED WASTE UNITS[a]

Description	Capacity	SWMU[b] No.	Associated Structure No./Area
Line 1 S01 Container Storage[c]			
Container storage area	275 gallons	16-012(a2)	Technical Area 16, Building 88 (TA-16-88)
Line 2 T04 Treatment - Open Burning			
Flash Pad 387 (one flash pad for burning potentially high explosives [HE]-contaminated equipment/materials)	40,000 pounds[d] (of waste per burn)	16-010(b)	TA-16-387
Line 3 T04 Treatment - Open Burning			
Burn Pads 388 and 399 (two burn pads for burning HE solids)	1,000 pounds (of waste per burn) at each unit	16-010(c) 16-010(d)	TA-16-388 TA-16-399
Line 4 T04 Treatment - Open Burning			
Burn Tray 394 (one burn tray for burning HE-contaminated oil/solvent mixtures)	250 gallons (of waste per burn)	16-010(j)	TA-16-394
Line 5 T04 Treatment - Open Burning			
Filter Vessels 401 and 406 (two pressure vessels for burning HE-contaminated sludges)	1,000 pounds (of waste per burn) at each unit	16-010(e) 16-010(f)	TA-16-401 TA-16-406

Explanation of Symbols/Abbreviations

a EPA Hazardous waste numbers for wastes that may be managed at the units are listed in the following table.

b SWMU = solid waste management unit.

c "Line 1 S01 Container Storage" refers to the total amount of container storage for hazardous and mixed waste at Technical Area (TA) 16, provided in Section XII, page 4 of 7, of this Part A permit application. For information on locations and capacities of other container storage areas for hazardous and mixed waste at Los Alamos National Laboratory (LANL), refer to Section 1.0 (i.e., the Part A Permit Application) of Revision 4.1 of LANL's Part B Permit Application for Hazardous Waste, November 1988 and to LANL's "RCRA Part A Permit Application for Mixed Waste," Rev. 2.0, September 1994.

d This amount is the estimated maximum weight of equipment or structures (with HE surface contamination only) that may be burned at the flash pad at one time.

EPA HAZARDOUS WASTE NUMBERS AND ASSOCIATED UNITS MANAGING WASTE
(Page 1 of 4)

EPA Hazardous Waste Number	Process Code	Unit(s) Managing Waste
D001	S01	TA-16-88
	T04	TA-16-387
	T04	TA-16-394
	T04	TA-16-401
	T04	TA-16-406
D002	T04	TA-16-394
D003	S01	TA-16-88
	T04	TA-16-387
	T04	TA-16-388
	T04	TA-16-394
	T04	TA-16-399
	T04	TA-16-401
	T04	TA-16-406
D005	S01	TA-16-88
	T04	TA-16-387
	T04	TA-16-388
	T04	TA-16-394
	T04	TA-16-399
	T04	TA-16-401
	T04	TA-16-406
D006	T04	TA-16-387
D007	T04	TA-16-387
	T04	TA-16-394
D008	S01	TA-16-88
	T04	TA-16-387

EPA HAZARDOUS WASTE NUMBERS AND ASSOCIATED UNITS MANAGING WASTE
(Page 2 of 4)

EPA Hazardous Waste Number	Process Code	Unit(s) Managing Waste
D009	S01	TA-16-88
	T04	TA-16-387
	T04	TA-16-394
D011	T04	TA-16-387
D022	T04	TA-16-387
	T04	TA-16-394
D028	T04	TA-16-387
	T04	TA-16-394
D030	T04	TA-16-387
D035	T04	TA-16-387
	T04	TA-16-394
D038	T04	TA-16-387
	T04	TA-16-394
F001	T04	TA-16-387
	T04	TA-16-394
	T04	TA-16-401
	T04	TA-16-406
F002	T04	TA-16-387
	T04	TA-16-388
	T04	TA-16-394
	T04	TA-16-401
	T04	TA-16-406
	T04	TA-16-399
F003	T04	TA-16-387
	T04	TA-16-394
	T04	TA-16-401

EPA HAZARDOUS WASTE NUMBERS AND ASSOCIATED UNITS MANAGING WASTE
(Page 3 of 4)

EPA Hazardous Waste Number	Process Code	Unit(s) Managing Waste
F003 (continued)	T04	TA-16-406
F005	T04	TA-16-387
	T04	TA-16-388
	T04	TA-16-394
	T04	TA-16-399
	T04	TA-16-401
	T04	TA-16-406
K044	T04	TA-16-401
	T04	TA-16-406
K045	T04	TA-16-387
K047	T04	TA-16-401
	T04	TA-16-406
P009	T04	See note at end of this table.
P065	T04	See note at end of this table.
P081	T04	See note at end of this table.
P112	T04	See note at end of this table.
U003	T04	See note at end of this table.
U044	T04	See note at end of this table.
U056	T04	See note at end of this table.
U069	T04	See note at end of this table.
U105	T04	See note at end of this table.
U106	T04	See note at end of this table.
U107	T04	See note at end of this table.
U112	T04	See note at end of this table.
U113	T04	See note at end of this table.
U118	T04	See note at end of this table.
U154	T04	See note at end of this table.

EPA HAZARDOUS WASTE NUMBERS AND ASSOCIATED UNITS MANAGING WASTE
(Page 4 of 4)

EPA Hazardous Waste Number	Process Code	Unit(s) Managing Waste
U159	T04	See note at end of this table.
U160	T04	See note at end of this table.
U189	T04	See note at end of this table.
U213	T04	See note at end of this table.
U234	T04	See note at end of this table.

Note:
P- or U-listed hazardous wastes are not expected to be treated at the TA-16 burn ground. However, there is a possibility that leaks/spills or extremely small quantities of off-specification commercial chemical product waste could be generated and subsequently treated at TA-16-394 (for HE-contaminated off-specification commercial chemical products) or TA-16-401 and/or TA-16-406 (for HE-contaminated wash down water).

ATTACHMENT 2

TOPOGRAPHIC MAPS

LIST OF TOPOGRAPHIC MAPS

MAP NO.	MAP TITLE
1	Contour Map Showing All Technical Areas (TA) at Los Alamos National Laboratory (LANL)
2	Contour Map Showing Hazardous and Mixed Waste Units at Technical Area (TA) 16
3	Location Map of Waste Supply Wells, Monitoring Wells, Test Wells, Springs, and Surface Water Sampling Stations
4	Los Alamos National Laboratory (LANL) National Pollutant Discharge Elimination System (NPDES) Outfall Locations
5	Location Map of Technical Area (TA) 57, Fenton Hill Geothermal Site

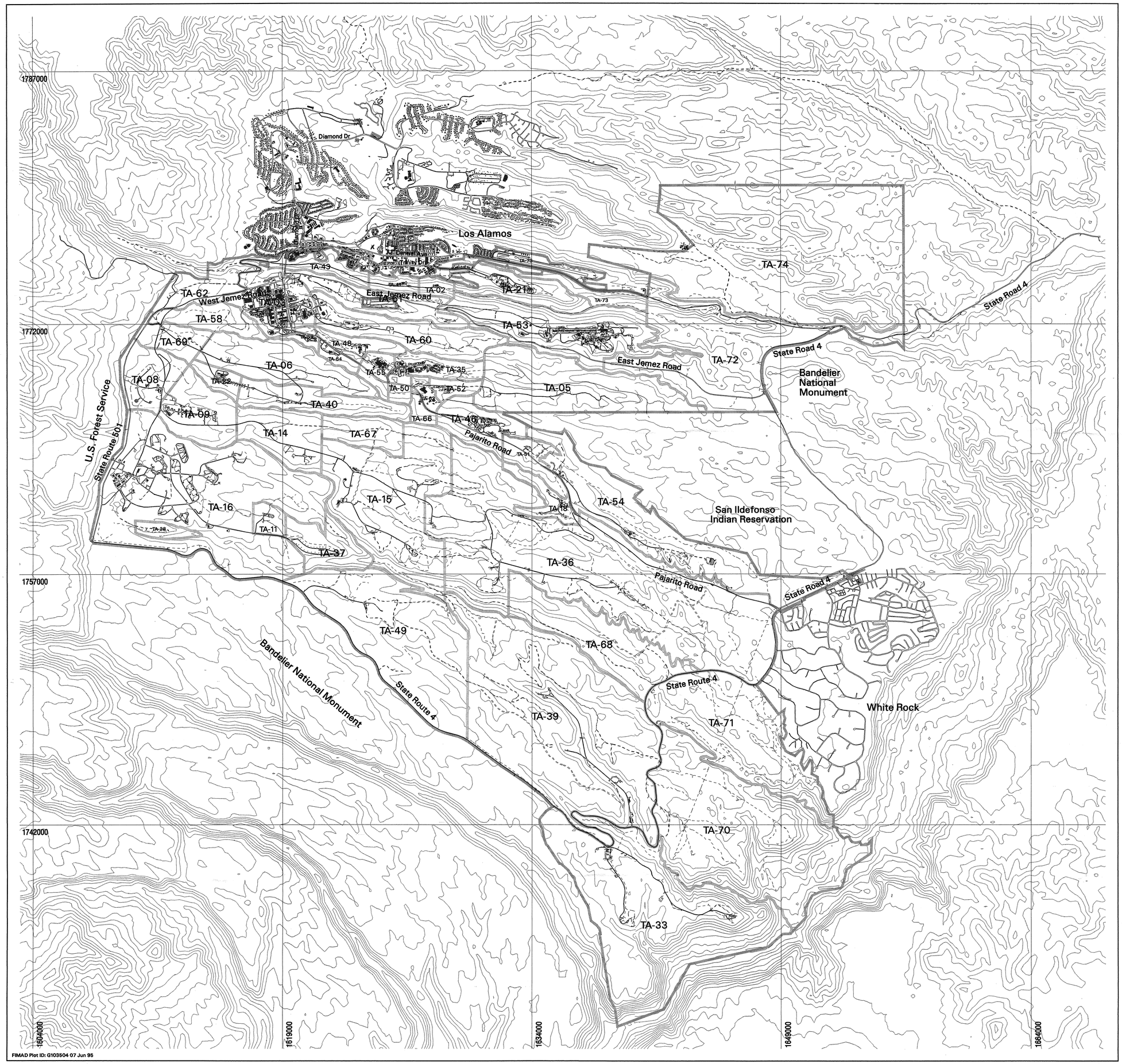
Note: For topographic maps showing LANL's other hazardous and mixed waste units, refer to Section 1.0 of Revision 4.1 of LANL's Part B Permit Application for Hazardous Waste, November 1988 and to LANL's "RCRA Part A Permit Application for Mixed Waste," Rev. 2.0, September 1994.

Map 1: Contour Map Showing All Technical Areas (TA) at Los Alamos National Laboratory (LANL)

- Boundary, LANL
- Boundary, TA
- Contours, 100 foot
- Roads, Dirt
- Roads, Paved
- Trail
- Building

NOTE: TA-67, Fenton Hill Site, not shown

5973-A



FIMAD Plot ID: G103504 07 Jun 95

N

State Plane Coordinate System, New Mexico Central Zone.
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid interval, in 'feet': 15000
Feet per inch on map = 3000

SCALE 1:36000

0 914 1828 2742 3656

METERS

0 3000 6000 9000 12000

FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1985. Other boundary, structure and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data are from Los Alamos National Laboratory Environmental Restoration Project aerial survey, September, 1991.

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Produced by: Doug Walther

Date: June 07, 1995 FIMAD Plot ID: G103504

Map 2: Contour Map Showing Hazardous and Mixed Waste Units at Technical Area (TA) 16

FIMAD Plot ID: G103507 07 Jun 95

LEGEND

- Boundary, Los Alamos National Laboratory
- Boundary, TA
- Contours, 10 foot
- Contours, 100 foot
- Fence, Industrial
- Fence, Security
- Solid Waste Management Unit (SWMU) Boundary
- Roads, Dirt
- Roads, Paved
- Road/Trail
- Material Disposal Area
- Former Structure
- Permanent Structure
- Temporary Structure
- Structure with Treatment, Storage, or Disposal (TSD) Area(s)

5973-B

N

State Plane Coordinate System, New Mexico Central Zone.
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid interval, in 'feet': 5000
Feet per inch on map = 700

SCALE 1:8400

0 213 426 639 852

METERS

0 700 1400 2100 2800

FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Other boundary, structure and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data are from Los Alamos National Laboratory Environmental Restoration Project aerial survey, September, 1991.

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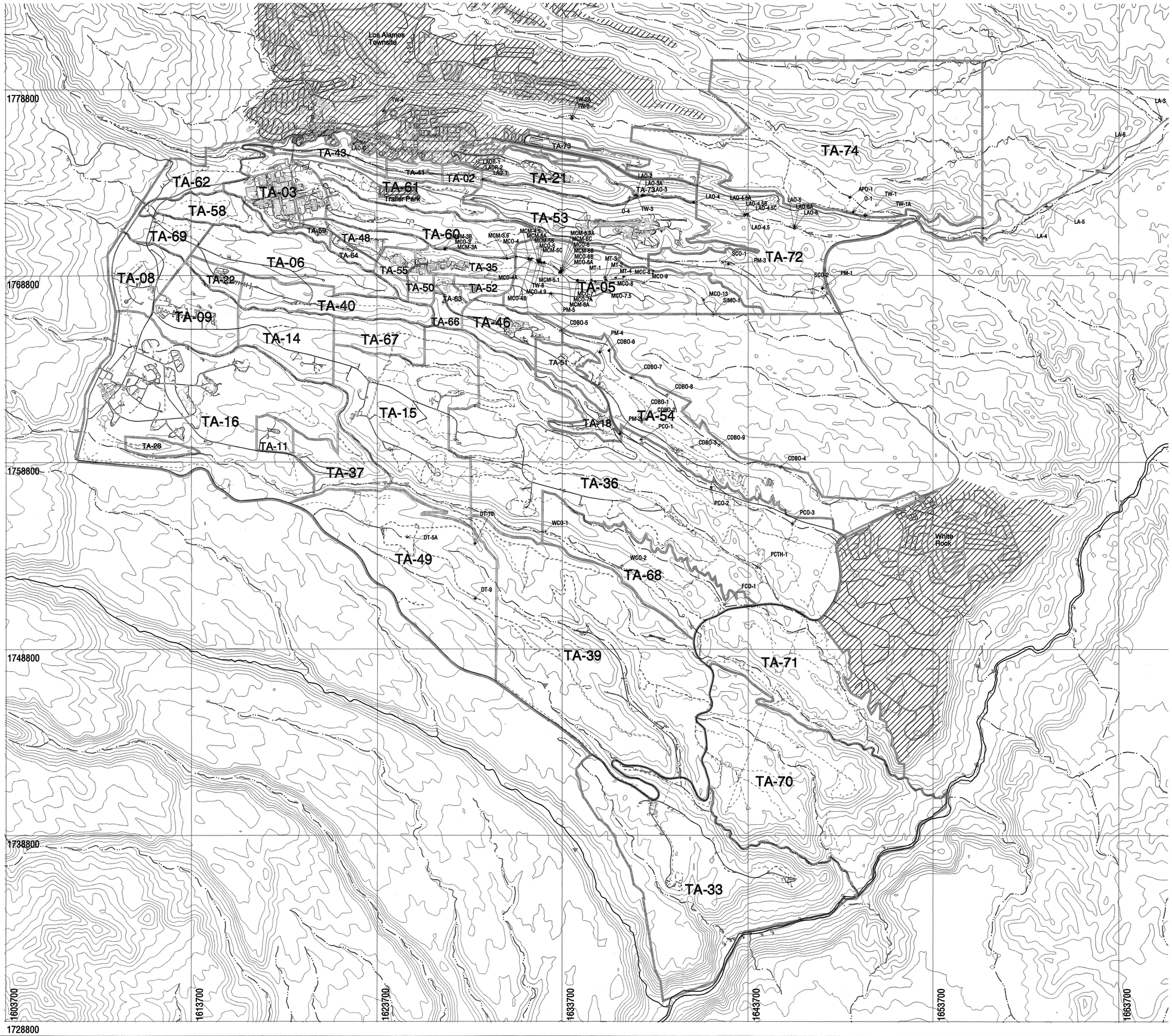
Date: June 07, 1995 FIMAD Plot ID: G103507



LEGEND

- Boundary, Los Alamos National Laboratory
- Boundary, Technical Area (TA)
- Contours, 100 foot
- Roads, Dirt
- Roads, Paved
- Road/Trail
- Stream, Intermittent
- Stream, Perennial
- Building
- Residential Areas

PERCHED ALLUVIAL MONITORING WELLS
(Old wells are pre-1990, new wells installed since 1990 according to EPA guidelines)

- New Dry Well
- Old Dry Well
- New Saturated Well
- Old Saturated Well

MAIN AQUIFER WELLS

- Water Supply Well
- Test Well

OTHER

- LAOR Well
- Abandoned/Plugged Well

- Surface Water Sampling Station
- Spring

5973-C

MAP 3:
Location Map of Water Supply Wells, Monitoring Wells, Test Wells, Springs, and Surface Water Sampling Stations

N

State Plane Coordinate System, New Mexico Central Zone.
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid interval, in 'feet': 10000
Feet per inch on map = 2500

SCALE 1:30000

0 762 1524 2286 3048

METERS

0 2500 5000 7500 10000

FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Other boundary, structure and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data are from Los Alamos National Laboratory Environmental Restoration Project aerial survey, September, 1991.

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Date: June 09, 1995 FIMAD Plot ID: G103506

NPDES OUTFALL LOCATIONS

NPDES Outfall Locations

LEGEND

- County Boundary
- Drainage
- LANL Boundary
- Roads, Paved
- 100-ft Contours
- 20-ft Contours

OUTFALL CATEGORIES

- 01A
- 02A
- 03A
- 04A
- 05A
- 06A
- Miscellaneous

5973-D

MAP 4:
LOS ALAMOS NATIONAL LABORATORY (LANL)
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) OUTFALL LOCATIONS

N

State Plane Coordinate System, New Mexico Central Zone.
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid interval, in 'feet': 10000
Feet per inch on map = 1750

SCALE 1:21000

0 533 1066 1599 2132

METERS

0 1750 3500 5250 7000

FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Other boundary, structure and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data are from Los Alamos National Laboratory Environmental Restoration Project aerial survey, September, 1991.

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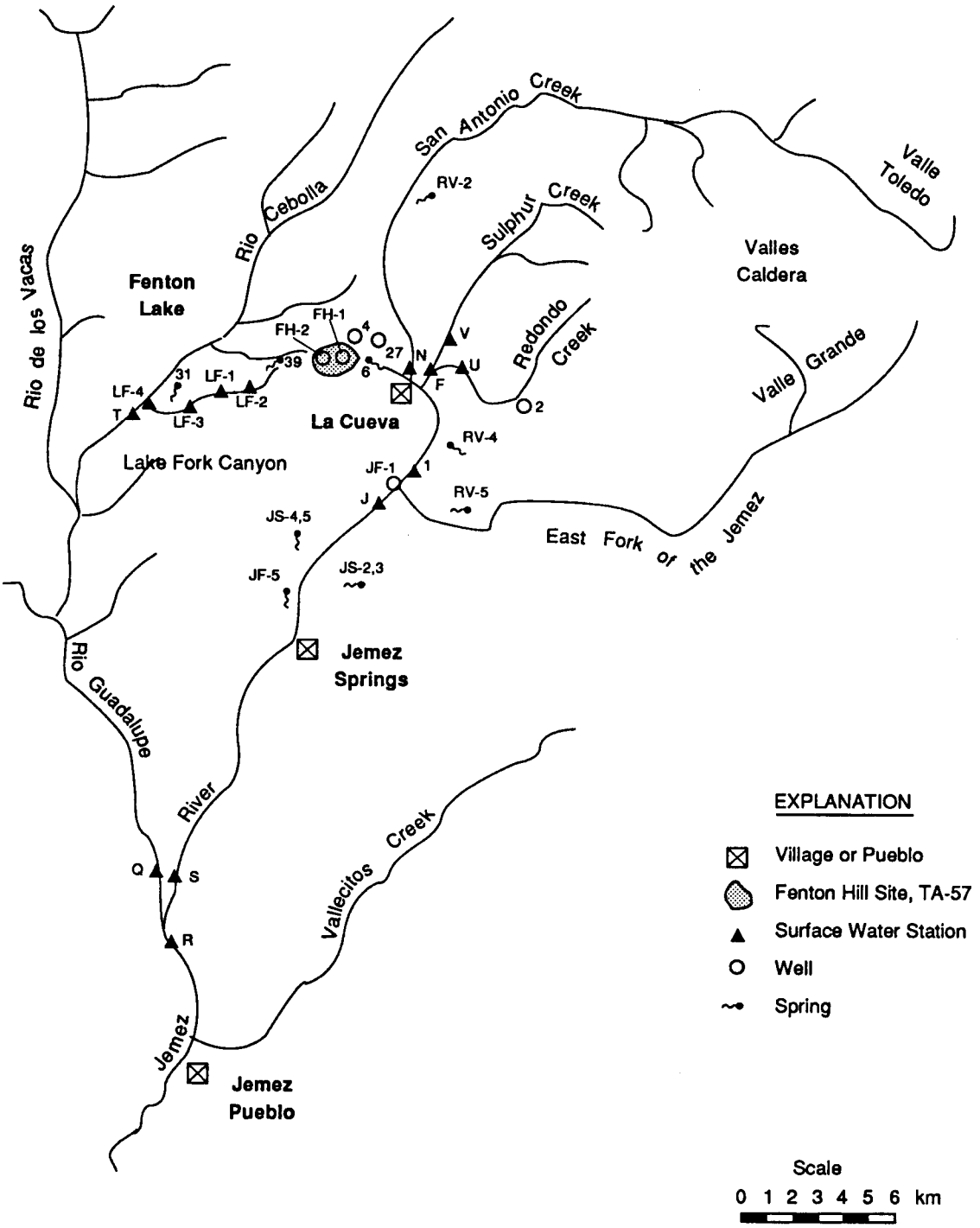
Produced by: Doug Walther

Date: June 09, 1995 FIMAD Plot ID: G103505



Reference: "Environmental Surveillance at Los Alamos During 1992," 1994, LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Map 5

Location Map of Technical Area (TA) 57, Fenton Hill Geothermal Site

ATTACHMENT 3

FACILITY DRAWINGS

LIST OF FACILITY DRAWINGS

FIGURE NO.	TITLE
1	Location Map of Los Alamos National Laboratory Technical Areas
2	Site Location Plan for Technical Area (TA) 16, Building 88
3	Technical Area 16, Building 88, Container Storage Area
4	Site Location Plan for Technical Area (TA) 16 Burn Ground
5	Technical Area (TA) 16 Burn Ground

Note: For facility drawings showing LANL's other hazardous and mixed waste units, refer to Section 1.0 of Revision 4.1 of LANL's Part B Permit Application for Hazardous Waste, November 1988 and to LANL's "RCRA Part A Permit Application for Mixed Waste," Rev. 2.0, September 1994.

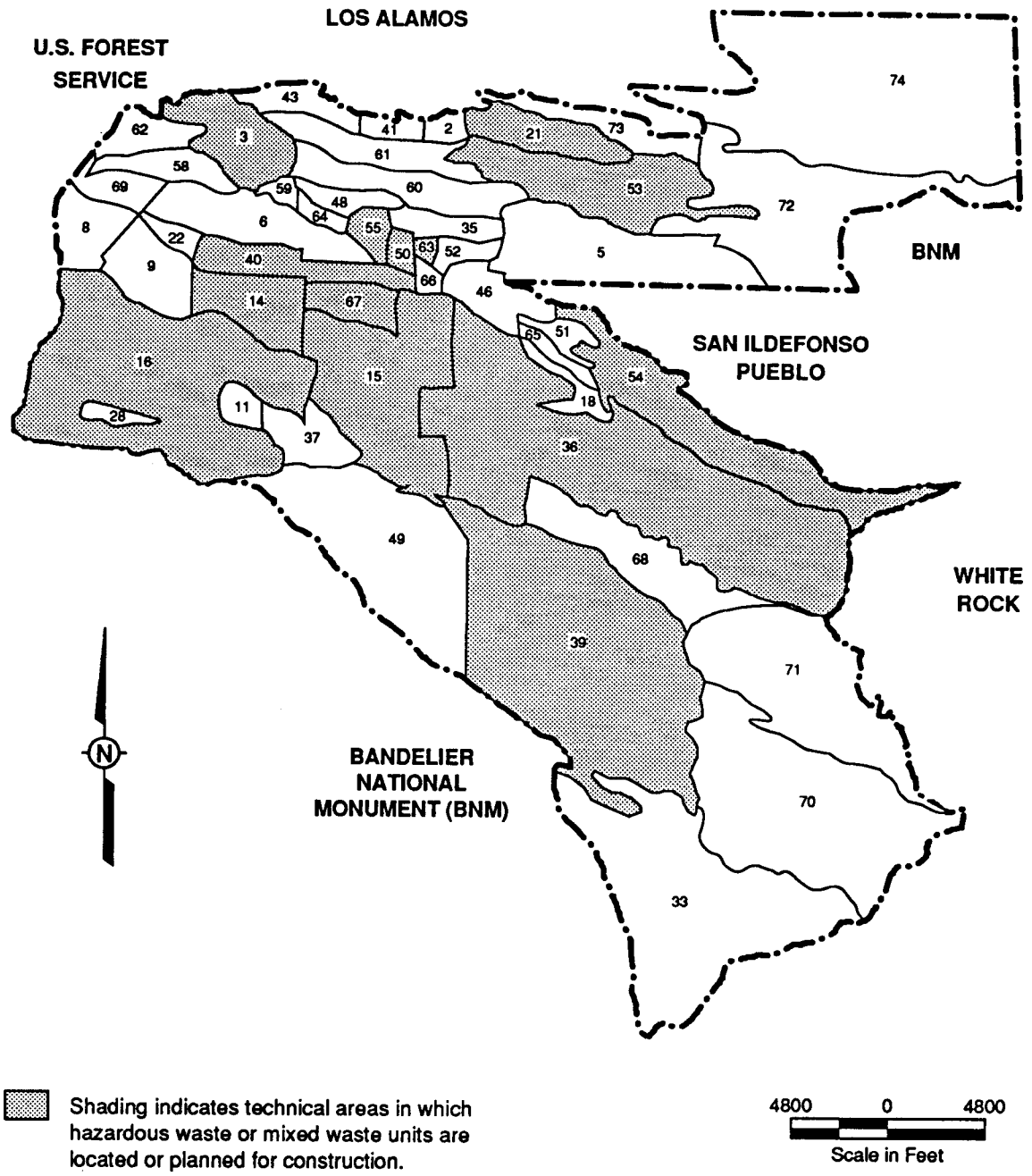


Figure 1
Location Map of Los Alamos National Laboratory Technical Areas

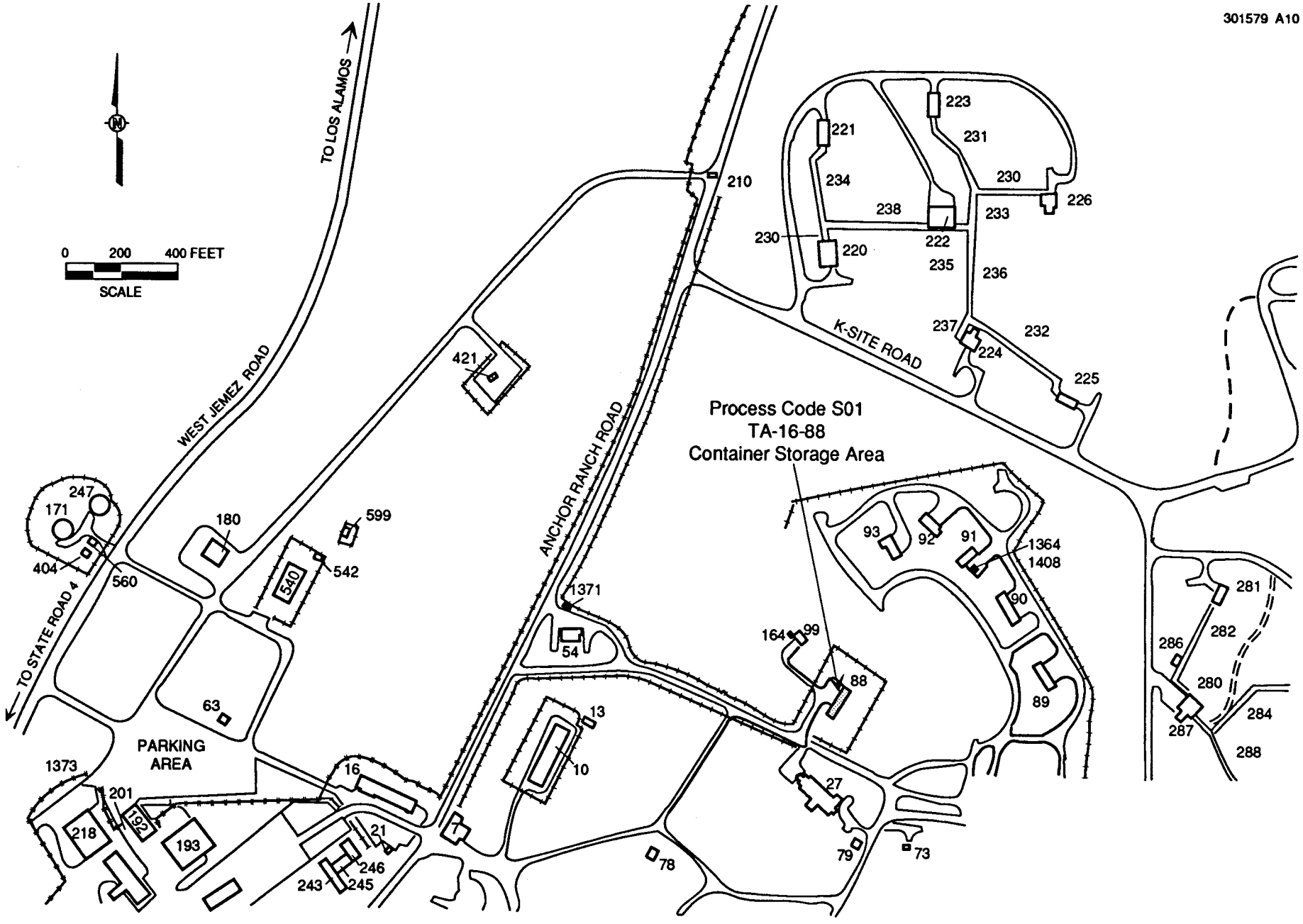


Figure 2
Site Location Plan for Technical Area (TA) 16, Building 88

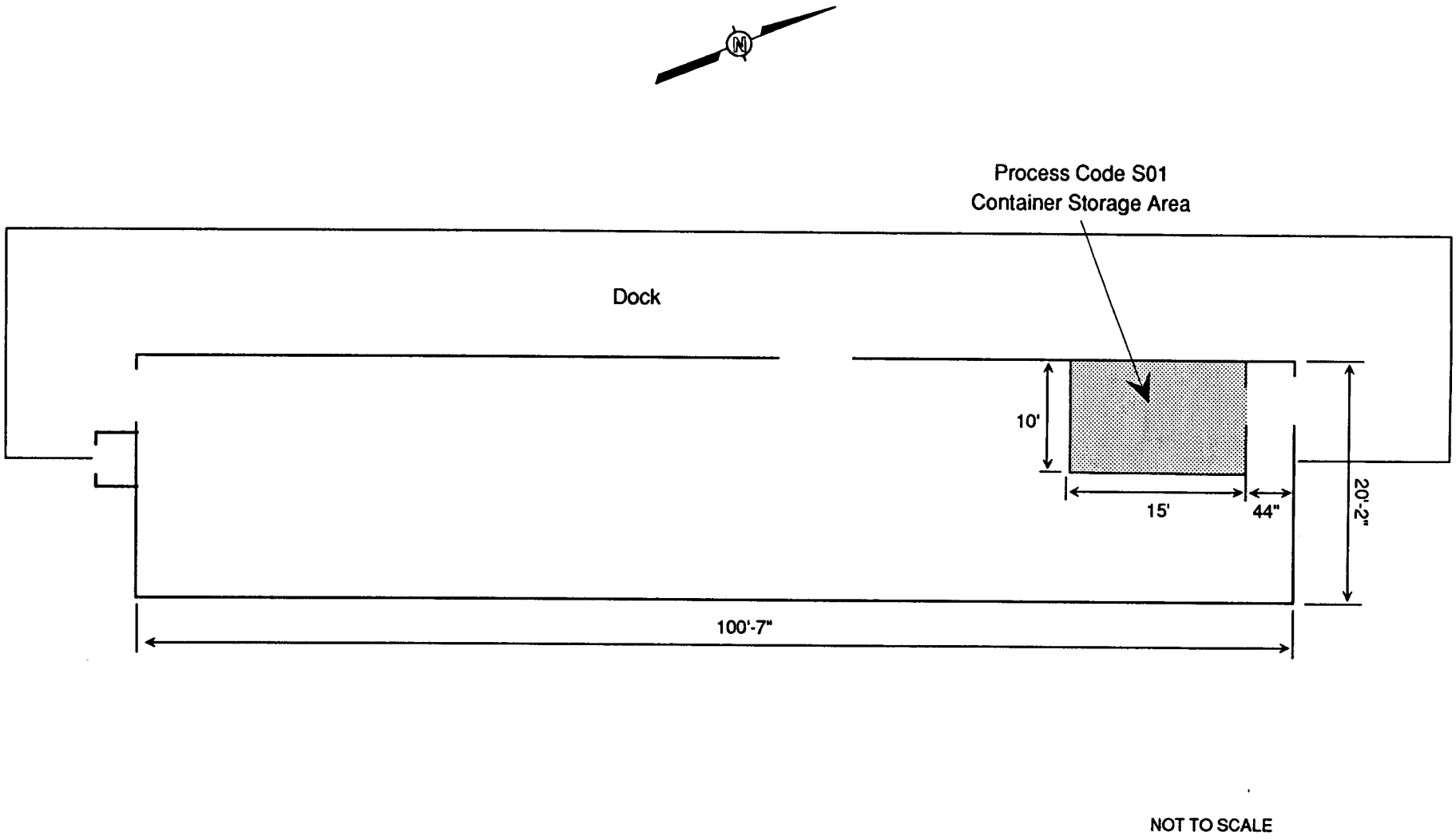


Figure 3
Technical Area 16, Building 88, Container Storage Area

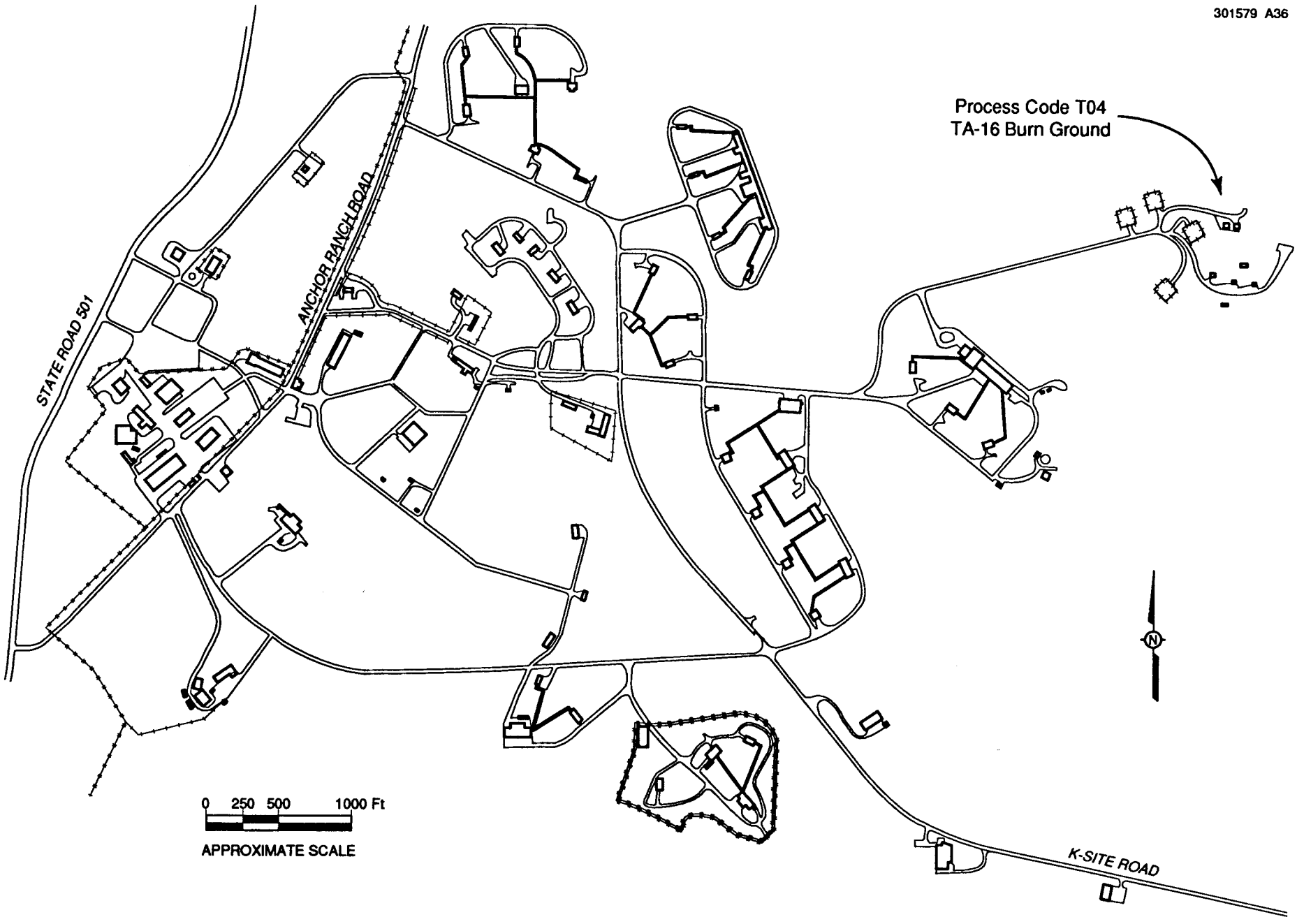


Figure 4
Site Location Plan for Technical Area (TA) 16 Burn Ground

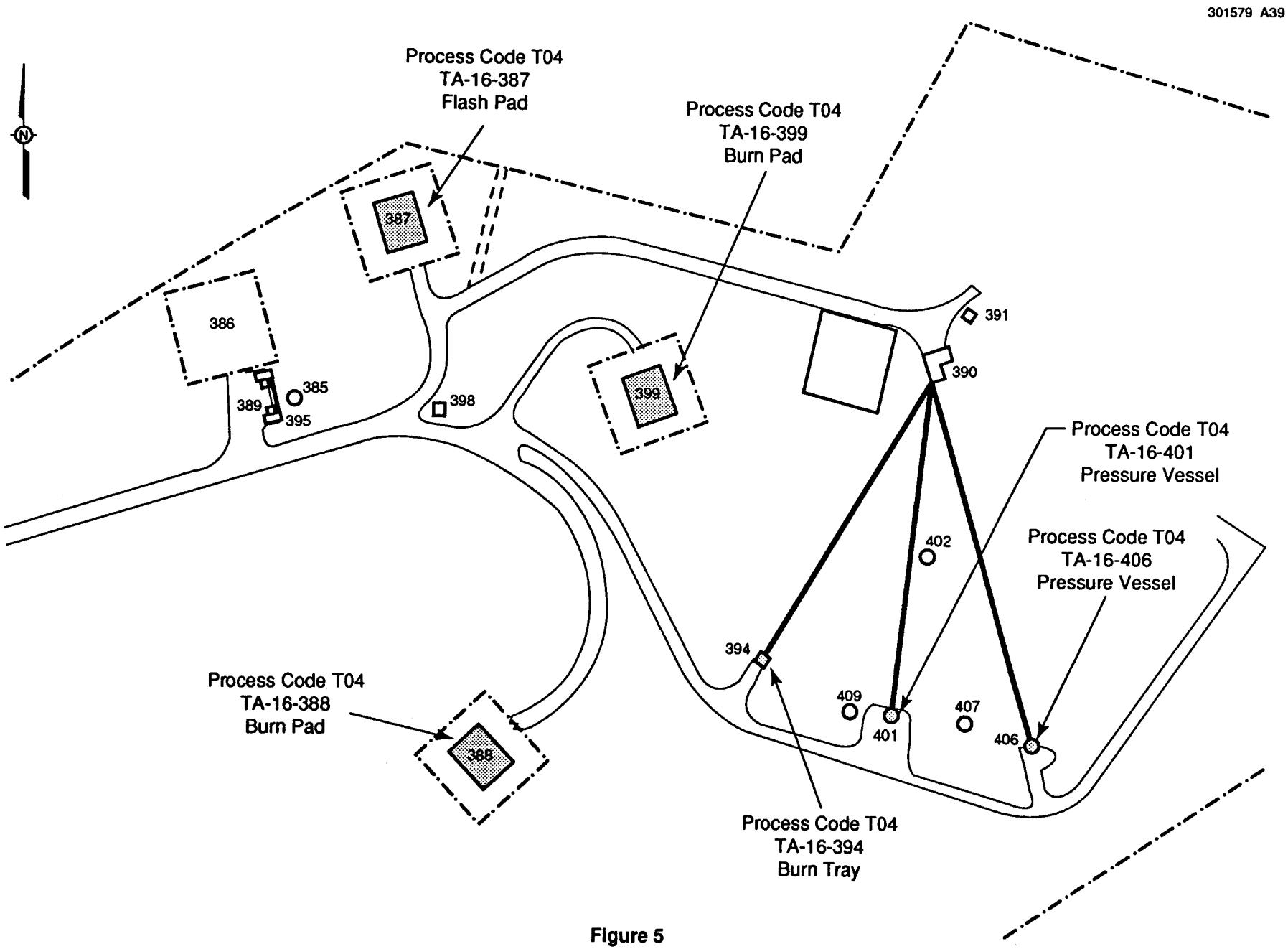


Figure 5
Technical Area (TA) 16 Burn Ground

ATTACHMENT 4

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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TA-16-88, Process Code S01, Container Storage Area 4-1

TA-16-88, Process Code S01, Container Storage Area 4-1

TA-16-387, Process Code T04, Burn Pad for Flashing High Explosives - Contaminated Equipment 4-2

TA-16-387, Process Code T04, Burn Pad for Flashing High Explosives - Contaminated Equipment 4-2

TA-16-388, Process Code T04, Burn Pad 4-3

TA-16-399, Process Code T04, Burn Pad 4-3

TA-16-394, Process Code T04, Burn Pan for High Explosives - Contaminated Oil/Solvents 4-4

TA-16-394, Process Code T04, Burn Pan for High Explosives 4-4

TA-16-401 and TA-16-406, Process Code T04, Filter Vessels for Dried High Explosives Sludge 4-5

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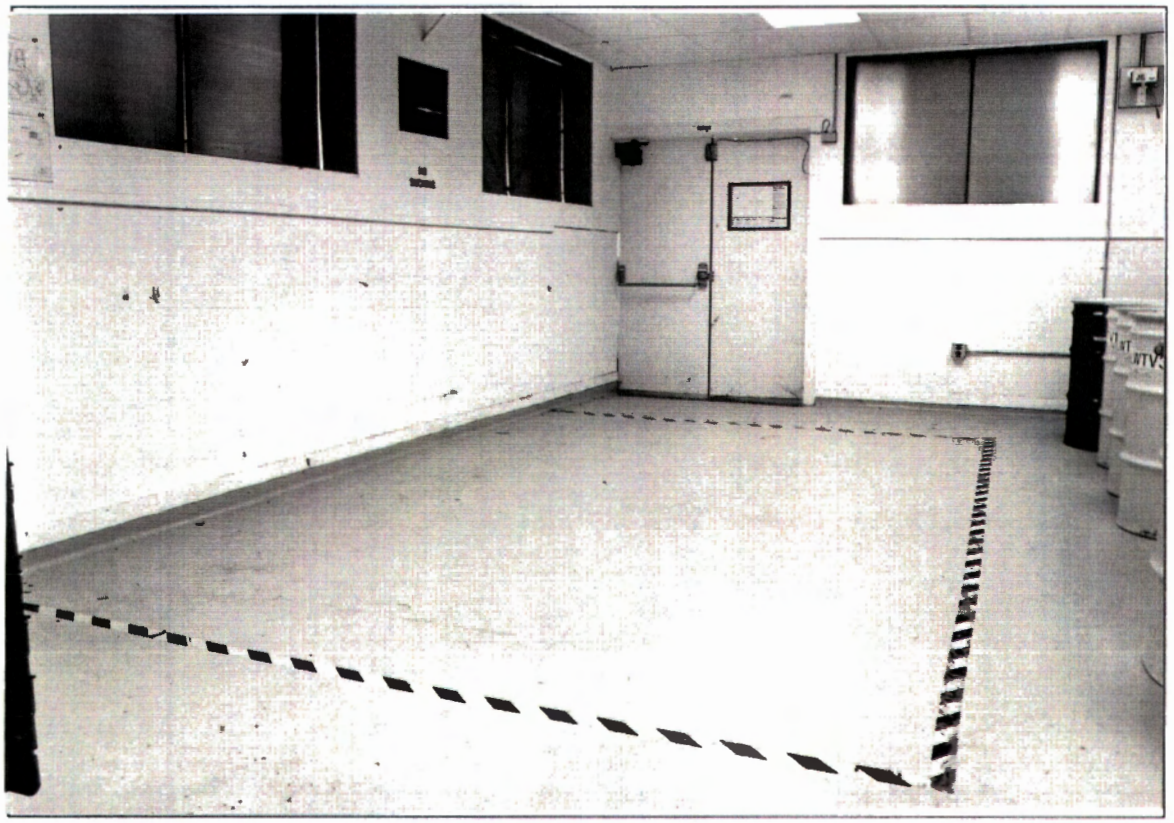
Note: For photographs showing LANL's other hazardous and mixed waste units, refer to Section 1.0 of Revision 4.1 of LANL's Part B Permit Application for Hazardous Waste, October 1988 and to LANL's "RCRA Part A Permit Application for Mixed Waste," Rev. 2.0, September 1994..

TA-16-88, Process Code S01, Container Storage Area
(View is looking east at Building 88)



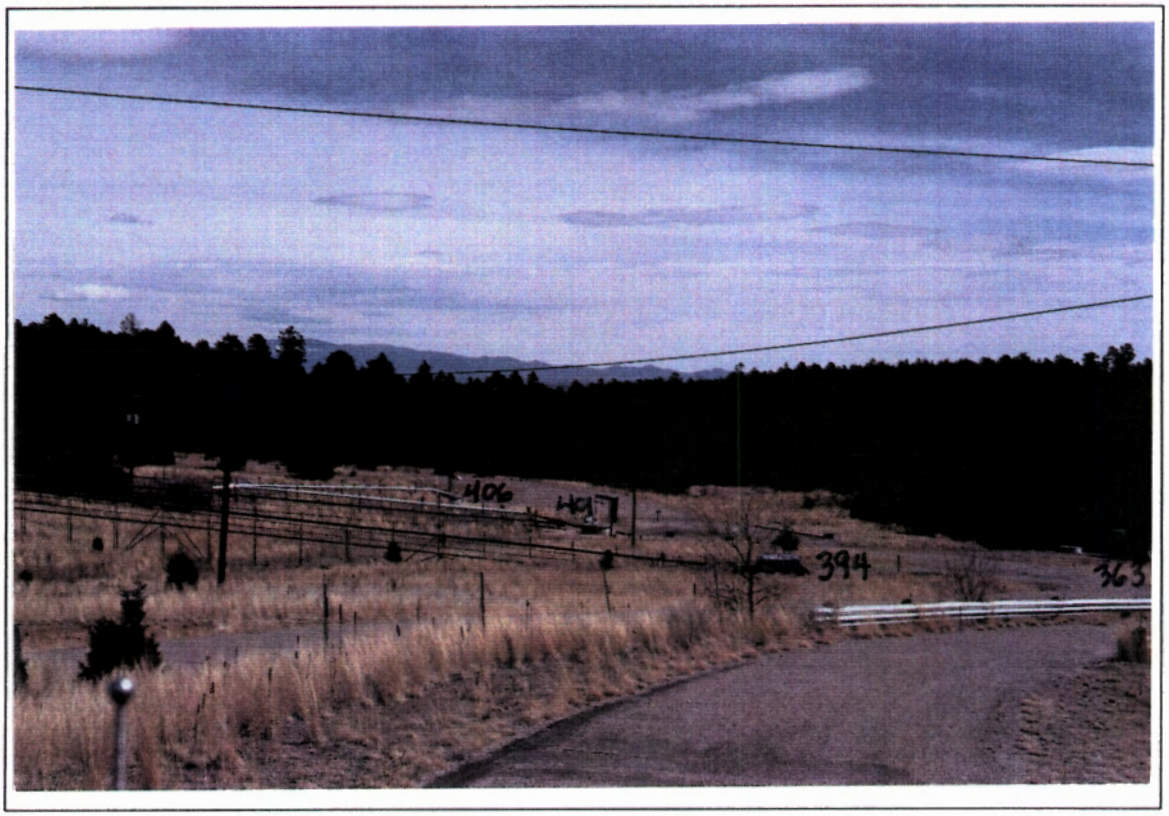
TA-16-88, Process Code S01, Container Storage Area

TA-16-387, Process Code T04, Burn Pad for Flashing High Explosives - Contaminated Equipment

TA-16-387, Process Code T04, Burn Pad for Flashing High Explosives - Contaminated Equipment

TA-16-388, Process Code T04, Burn Pad

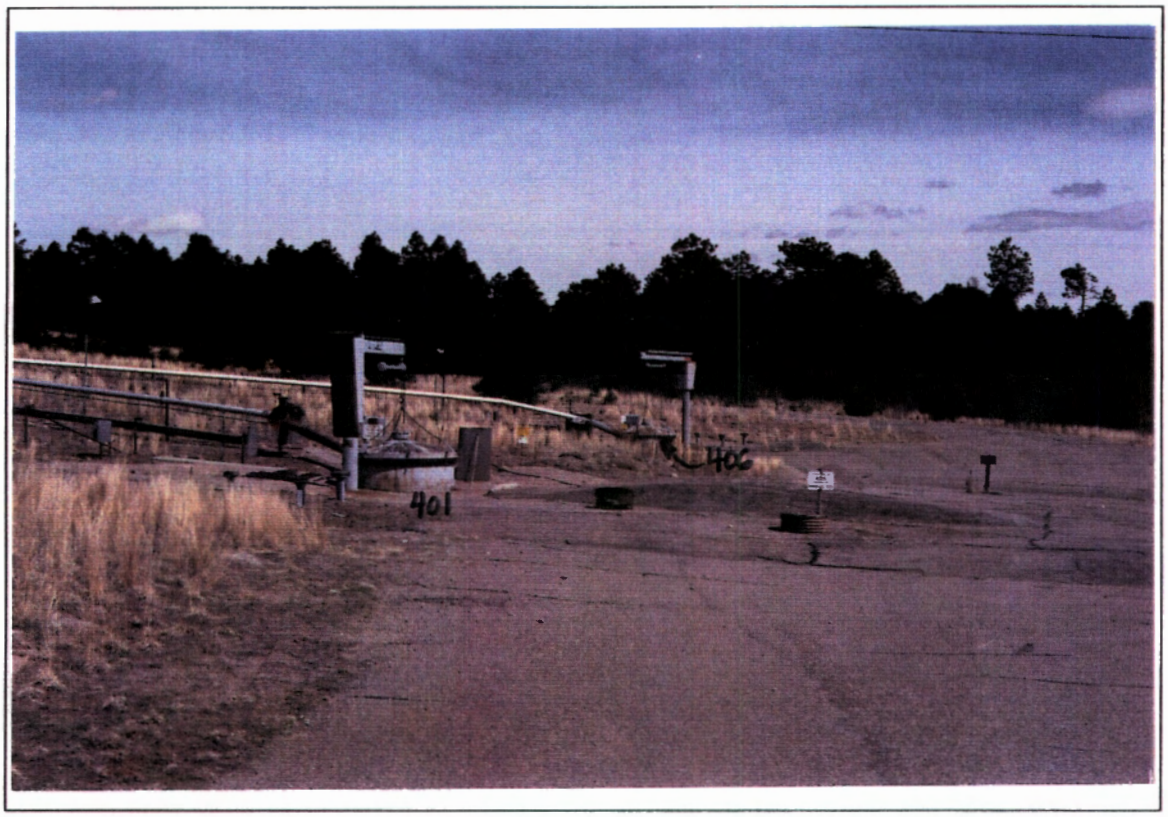
TA-16-399, Process Code T04, Burn Pad



TA-16-394, Process Code T04, Burn Pan for High Explosives

TA-16-394, Process Code T04, Burn Pan for High Explosives

TA-16-401 and TA-16-406, Process Code T04, Pressure Vessels for Dried High Explosives Sludge
(View is looking southeast)



TA-16-401 and TA-16-406, Process Code T04, Pressure Vessels for Dried High Explosives Sludge
(View is looking northeast)

2.0 FACILITY DESCRIPTION

The information provided in this section is submitted in accordance with the applicable requirements of the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart IX, 270.14(b)(1), 270.14(b)(10), 270.14(b)(11), and 270.14(b)(19), and 20 NMAC 4.1, Subpart V, 264.18(a). The following subject areas are addressed in this section: a general description of the Los Alamos National Laboratory (LANL) facility; traffic patterns, volume, and control; facility location information for compliance with the seismic standard and floodplain requirements; and topographic map requirements.

2.1 GENERAL DESCRIPTION [20 NMAC 4.1, Subpart IX, 270.14(b)(1) and 270.14(b)(19)(xii)] LANL is located in Los Alamos County, an incorporated county, in north-central New Mexico, approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. The regional location of LANL is shown on Figure 2-1. LANL, which occupies an area of 43 square miles, and the associated residential and commercial areas of Los Alamos County, which occupies an area of 109 square miles, are situated on the Pajarito Plateau. The plateau consists of a series of finger-like mesas separated by deep east-west trending canyons. Ephemeral, or intermittent, streams lie at the bottoms of all the canyons. The mesa tops range in elevation from approximately 7,800 feet (ft) above mean sea level (amsl) at the flank of the Jemez Mountains, located to the west of Los Alamos, to about 6,200 ft amsl at their eastern extent, where they terminate above the Rio Grande Valley.

The area is characterized by a semiarid, temperate mountain climate with summer temperatures typically ranging from a low of 50 degrees Fahrenheit (°F) to 80°F and winter temperatures from the teens to approximately 50°F. The annual precipitation ranges from 13 to 18 inches, mostly occurring in July and August (Biological Resources Evaluation Team [BRET], 1993).

LANL, a multidisplinary laboratory owned by the U.S. Department of Energy (DOE), is operated jointly by DOE and the University of California. The principal mission of LANL includes the research, design, development, and analysis of weapons components for the nation's nuclear arsenal. This effort is supported by research programs such as nuclear physics, hydrodynamics, conventional explosives, chemistry, metallurgy, radiochemistry, and biology. In addition to its defense program efforts, LANL supports energy research and environmental missions with programs including medium-energy physics; space nuclear systems; controlled thermonuclear fusion; laser research; environmental research; geothermal, solar, and fossil energy research; nuclear safeguards; biomedical research; and space physics. In 1992, LANL expanded its mission in support of environmental management to include development of new

programs in the areas of health and biotechnology, environmental technologies, and industrial partnerships.

LANL is divided into 49 technical areas (TA). Thirty-eight of these TAs are developed (Figure 2-2). The waste management units at LANL that are addressed in this permit application include the TA-16 container storage area (Building 88) for hazardous and mixed waste storage and the open burn units at TA-16 for hazardous waste treatment.

Other Resource Conservation and Recovery Act (RCRA) units at or planned to be located at LANL include the following:

- Units that are permitted for hazardous waste storage and treatment
- Units that operate under interim status facility standards for hazardous and mixed waste storage and treatment
- Units that are planned for construction for hazardous and mixed waste storage, treatment, and disposal.

These units are located or planned for construction at 14 TAs (see Figure 2-2).

Units that are permitted for hazardous waste storage or treatment include the following:

- Container storage areas and treatment/storage tanks at TA-54, Area L. Two of the tanks are currently undergoing RCRA closure.
- The batch waste treatment unit and associated storage areas at TA-50-1. The batch waste treatment unit is currently undergoing RCRA closure.
- The controlled air incinerator and associated storage areas at TA-50-37.
- An industrial incinerator at TA-16.

Units that are permitted for mixed waste storage include:

- Container storage areas for transuranic (TRU) mixed waste at TA-54, Area G. These container storage areas include Storage Pads 1, 2, and 4, which are existing, and Storage Domes A, B, C, and D, which are under construction.

Units that are operating under interim status facility standards include the following:

- Thermal treatment units for open burning/open detonation of high-explosive (HE) waste at TA-14, TA-15, TA-16, TA-36, and TA-39. One thermal treatment unit, the scrap detonation site at TA-40, is undergoing RCRA closure under interim status.

- Container storage areas and storage tanks for mixed waste located at TA-3, TA-16, TA-21, TA-50, TA-54, and TA-55.
- Surface impoundments for storage of mixed waste at TA-53. These surface impoundments will undergo RCRA closure under interim status.
- Mixed waste treatment units (waste solidification/cementation) at TA-50-1 and TA-55-4.
- An oxygen sparging furnace at TA-55-4 for treatment of mixed waste. This unit will undergo RCRA closure under interim status.
- Container storage areas at the Radioassay and Nondestructive Testing Facility (TA-54-38) at TA-54 West.
- Container storage areas at TA-54, Area G. These units include Storage Domes 48, 49, 153, 224, and 283; the Drum Prep Facility (DPF) (TA-54-33); and Storage Sheds 8, 1027, 1028, 1029, and 1041.

Units that are planned for construction at LANL and for which permit applications/modification requests have been submitted include the following:

- Hazardous and mixed waste treatment and storage units at the Hazardous Waste Treatment Facility, TA-63.

There are one existing and one planned hazardous/mixed waste decontamination areas at LANL. A centralized decontamination area at TA-50 is used for cleanup of equipment associated with hazardous and mixed waste operations. The decontamination area is located in Room 34 in the south wing of Building 1. The area is a high bay that can accommodate equipment of all sizes, including vehicles. A decontamination area will be established at the DPF at TA-54, Area G, during an upgrade of that facility. This area will be used for cleanup of equipment associated with the container retrieval project at TA-54, Area G, and for general site activities. The decontamination area in the DPF will be large enough to accommodate large earth-moving equipment.

For information on the hazardous and mixed waste units listed above, refer to LANL's "RCRA Part A Permit Application for Mixed Waste," Revision 2.0 (LANL, 1994b) and LANL's "RCRA Part B Permit Application," Revision 4.1 (LANL, 1988).

2.1.1 TA-16

TA-16 is located in the southwestern quadrant of LANL. It is bounded on the north by TA-8, TA-9, TA-14 and Cañon de Valle; on the east by TA-11, TA-15, TA-37, and TA-49; on the south by State Road 4 and Bandelier National Monument; and on the west by West Jemez Road and

Santa Fe National Forest (see Map 1 of the TA-16 Part A permit application, included as Attachment 1-1 of Section 1.0). Elevation ranges from approximately 7,700 ft at the west end of the TA to approximately 6,800 ft at the lower east end. Topography is varied, ranging from steep precipitous canyon walls to sloping mesa tops.

This permit application includes a container storage area (Building 88) and open burning units at TA-16. The container storage area is for storage and handling of classified waste (Figures 2-3 and 2-4). Four types of open burning units are located at the TA-16 burning ground: a flash pad (TA-16-387), where HE contamination is removed from excess equipment or scrap thought to have HE contamination; two burn pads (TA-16-388 and -399) for the destruction of solid HE material; a burn tray located on a pad (TA-16-394), where HE-contaminated solvents and oil are burned; and two filter vessels (TA-16-401 and -406), composed of sand layers from fine to coarse gravel, for filtration of waste HE sludge from wastewater (Figure 2-5). Specific standard operating procedures (SOP) for HE-contaminated waste handling at the open burn units are provided as Appendices C through J. The maximum storage capacity for TA-16-88 at any given time is 275 gallons (five 55-gallon drums).

A 100-ft square cyclone fence surrounds the flash pad area (TA-16-387), which is covered with sand. Concrete blocks are placed on the sand and the material to be flashed is placed on the blocks with additional wood fuel to maintain the burn until all HE has been reacted. The scrap material is then handled as administratively-controlled, nonhazardous waste.

The two burn pads (TA-16-388 and -399), each surrounded by a 100-ft square chain link fence, are used to destroy solid chunks of excess or off-specification HE and machine turnings. The material is placed on a sand-filled steel table lined with refractory brick and ignited remotely.

At TA-16-394, used oil and/or solvent, which may be contaminated with HE, is poured into metal trays lined with fire brick. The trays are located within a sand-filled steel tray. The material is ignited remotely.

HE-contaminated wastewater is collected in sumps at HE-processing facilities located in several TAs. HE settles out of the wastewater, is collected in a vacuum truck, and is taken to TA-16 for treatment. The collected sludge is gravity fed from the vacuum truck to one of two filter vessels buried in the ground (TA-16-401 and -406). The wastes are separated from the water, dried, and burned in the vessel. Up to 1,000 pounds of sludge can be burned at one time. The vessels contain sand and gravel, and a fluid drain connects the base of the cone-shaped vessel

to a carbon-adsorption wastewater treatment unit. Treated effluent is regulated by two National Pollutant Discharge Elimination System (NPDES) permits (NMR00A384 and NM0028355). A complete description of the units and their practices is provided in section 4.0 of this permit application.

2.1.2 Biological Description

Activities with long term impact on the area began in 1742 with sheep grazing and subsistence farming. The dominant trees within the mesa overstory vegetation are ponderosa pine and aspen. The mesa top shrub layer is primarily composed of Gambel oak and New Mexico locust. Dominant forbs and grasses include bluegrass, mountain muhly, blue grama, pine dropseed, wormwood, false tarragon, tall lupine, and cinquefoil.

Threatened, endangered, and sensitive plants that could potentially use the area for habitat include: Checker lily, Sandia alumroot, Wood lily, and Pagosa phlox. None of these species have been found in the area. Threatened, endangered, and sensitive animals that could potentially use the area for habitat include: the Northern goshawk, the Common blackhawk, the Broad-billed hummingbird, the Willow flycatcher, the Spotted bat, the Peregrine falcon, the Bald eagle, the Mississippi kite, Pine marten, Say's pond snail, the Jemez Mountains salamander, the Mexican spotted owl, and the Meadow jumping mouse (BRET, 1993).

2.1.3 Topographic Maps [20 NMAC 4.1, Subpart IX, 270.14(b)(19)(i,vi,vii,x)]

Several maps and figures are provided for the waste management units included in this permit application to address the requirements of 20 NMAC 4.1, Subpart IX, 270.14(b)(19). All maps and figures clearly show a map scale, date, and north arrow. A LANL-wide 100-year floodplain map is provided on page 36 of the report included as Appendix A. Surrounding land uses are shown on Figure 2-1. Wind roses for LANL are shown on Figures 2-6 and 2-7. Natural surface drainages at the TA-16 open burn units and container storage area are shown on Map 2 of the TA-16 Part A permit application. Access ways and internal roads are shown on Figures 2-8 through 2-10.

Map 1 of the TA-16 Part A permit application shows the legal boundaries of LANL. Map 1 is a topographic map at a scale of 1 inch = 3,000 feet, and contour lines are in intervals of 100 feet. Map 2 of the TA-16 Part A permit application shows the locations of the hazardous and mixed waste units at TA-16. Map 2 is a topographic map at a scale of 1 inch = 700 feet, and contour lines are in intervals of 10 feet, which are sufficient to detail natural drainage in the vicinity of the units addressed in this permit application. As provided in 20 NMAC 4.1 Subpart IX, 270.14(b)(19), LANL requests that the New Mexico Environment Department (NMED) accept

the maps at these scales due to the size of the waste management units and the area of LANL. For topographic maps showing LANL's other hazardous and mixed waste units, refer to Section 1.0 of LANL's "RCRA Part B Permit Application," Rev. 4.1 (LANL, 1988) and to LANL's "RCRA Part A Permit Application for Mixed Waste," Rev. 2.0 (LANL, 1994b).

2.1.4 Wells and Surface Waters [20 NMAC 4.1, Subpart IX, 270.14(b)(19)(iii) and (ix)]

The municipal and industrial water supply for LANL and Los Alamos County is supplied by 13 deep wells in three well fields. The wells are located on the Pajarito Plateau and in canyons east of LANL. Water is pumped from the main aquifer, the surface of which ranges from approximately 600 to 1,200 ft below the surface of the plateau. The locations of supply wells, monitoring wells, test wells, springs, and surface-water sampling stations are shown on Map 3 of the TA-16 Part A permit application. Surface water on LANL property is limited primarily to ephemeral and intermittent streams in the canyon bottoms. The volume of water flow in these streams is generally dependent upon storm runoff, snow melt, and numerous NPDES outfalls discharging treated sanitary and industrial effluents. Perennial surface flow occurs in the Rito de los Frijoles south of LANL and in Santa Clara Canyon north of LANL. Springs on the flanks of the Jemez Mountains between elevations of 7,900 and 8,900 ft supply base flow throughout the year to the upper reaches of Cañon de Valle and in Guaje, Los Alamos, Pajarito, and Water Canyons (Purtymun, 1975). The flow volume from the springs is insufficient to maintain surface flow within more than the western third of the canyons before it is depleted by evaporation, transpiration, and infiltration into the underlying alluvium. Surface, well, and spring waters are sampled routinely and analyzed for radionuclides as well as organics (volatiles, semivolatiles, pesticides, herbicides, and polychlorinated biphenyls), heavy metals, fluorides, nitrates, carbonates, bicarbonates, silica, sodium, magnesium, and conductivity. Analytical results are published annually by LANL's Environmental Assessments and Resource Evaluations Group (ESH-20).

LANL has one geothermal well at TA-57, the Fenton Hill Geothermal Site, approximately 20 air miles west of Los Alamos. An NPDES-permitted industrial outfall for geothermal discharge is located at this site. This industrial outfall is designated NPDES Serial No. 001. The Fenton Hill Geothermal Site is shown on Map 5 of the TA-16 Part A permit application. Locations of all NPDES-permitted outfalls within the LANL boundary are provided on Map 4 of the TA-16 Part A permit application.

2.1.5 Wind Rose [20 NMAC 4.1, Subpart IX, 270.14(b)(19)(v)]

Surface winds are light at Los Alamos, averaging 7 miles per hour (mph), or 3 meters per second (m/s). Wind speeds are strongest from March through May and weakest in December

and January. The strongest winds are generally southwesterly to northwesterly and occur in the afternoon or evening. Night winds are usually west-northwesterly at the western edge of the Pajarito Plateau because of persistent cold air drainage down the plateau. Daytime winds are generally southeasterly to southwesterly, caused by upslope and up-valley winds. Daytime winds are also frequently westerly during the windy season (March through May).

Mean, annually averaged wind directions are plotted in wind roses at four sites (shown on Figures 2-6 and 2-7). Annually averaged daytime wind roses are depicted on Figure 2-6. Nighttime wind roses are shown on Figure 2-7. Day and night are defined by the times of sunrise and sunset. A wind rose is a circle with bars extending from the center, representing the direction from which the wind blows. The length of each bar is proportional to the wind-direction frequency. Each direction is 1 of 16 primary compass points (e.g., N, NNE) and is centered on a 22.5-degree-wide sector. The wind directions were taken at a height above ground of about 36 ft (11 meters [m]) at four sites: TA-6; TA-49; TA-53; and TA-54/White Rock. The wind direction at 300 ft (92 m) is also given for TA-6. The wind rose for this height is in the far upper right of Figures 2-6 and 2-7. The numbers in the center of each wind rose represent the percent frequency of calm winds (i.e., winds less than 1 mph). TA-6 and TA-49 are the closest wind rose data collection points to TA-16.

Los Alamos surface winds often vary dramatically with time of day, location, and height above ground because of the complex terrain. On sunny days, thermally driven (convective) upslope winds develop over the Pajarito Plateau. Upslope winds are generally light, less than 6 mph (3 m/s). Winds usually become more south-southwesterly and southerly at locations toward the Rio Grande Valley, where a larger-scale, thermally driven, up-valley wind predominates.

When sky conditions are clear and large-scale winds are light, locally produced winds reverse at night. At sunset, shallow drainage winds from the north to the northwest flow down the plateau, especially near the Jemez Mountains and in other areas with a greater slope. These winds can reach speeds of 6 to 8 mph (3 to 3.5 m/s).

2.1.6 Land Use [20 NMAC 4.1, Subpart IX, 270.14(b)(19)(iv)]

Los Alamos County, an incorporated county, encompasses several residential areas. The residential communities located closest to LANL are Los Alamos, located just north of LANL; White Rock, located east-southeast of LANL; and a trailer park within TA-61, which is located near the north-central boundary of LANL. According to 1992 University of New Mexico Bureau of Business and Economic Research data, the total population of Los Alamos County is approximately 18,200. Most of Los Alamos County, as well as adjoining portions of neighboring

Sandoval, Rio Arriba, and Santa Fe Counties, is undeveloped. The only significant developments in Los Alamos County are the LANL facilities and the associated residential and commercial areas. Large tracts of land in the Jemez Mountains, west of LANL in Los Alamos County, are held by the U.S. Forest Service (i.e., Santa Fe National Forest) and the National Park Service (i.e., Bandelier National Monument) (Figure 2-1). This land is largely occupied by piñon and ponderosa pine, juniper, fir, and aspen forests. Horticulture in the vicinity of LANL is limited to home gardens. In the river valleys to the east, agriculture is limited to the cultivation of relatively small irrigated plots. Primary crops are corn, chili, tree fruits, and alfalfa.

2.2 LOCATION INFORMATION

2.2.1 Seismic Standard [20 NMAC 4.1, Subpart IX, 270.14(b)(11)(i and ii) and 20 NMAC 4.1, Subpart V, 264.18(a)]

The hazardous waste units at TA-16 are exempt from the seismic design standards of 20 NMAC 4.1, Subpart IX, 270.14 (b)(11), and 20 NMAC 4.1, Subpart V, 264.18(a) because they were existing prior to the effective date of regulation. Consistent with the definitions presented in 20 NMAC 4.1, Subpart IX, 270.2 and the criteria provided in 20 NMAC 4.1, Subpart IX, 270.14(b)(11)(i), and 20 NMAC 4.1, Subpart V, 264.18(a), the TA-16 units are existing units; thus seismic design standards are not applicable.

2.2.2 Floodplain Standard [20 NMAC 4.1, Subpart IX, 270.14(b)(11)(iii) and 270.14(b)(19)(ii)]

In accordance with 20 NMAC 4.1, Subpart IX, 270.14(b)(11)(iii), the hazardous and mixed waste units addressed in this permit application are not located within the 100-year floodplain boundary. As required in "Module VIII: Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments to RCRA for Los Alamos National Laboratory, EPA I.D. NM0890010515" (U.S. Environmental Protection Agency [EPA], 1990; EPA, 1994a), LANL has mapped all 100-year floodplain boundaries within the LANL complex.

A report was published documenting the floodplain mapping procedures (McLin, 1992). This report is included as Appendix A. The floodplain boundary maps will reside on LANL's computer-based Autometric™ Geographic Information System--Mapping Overlay Statistical System, a graphic information system database.

2.2.3 Soils

A comprehensive soil survey of Los Alamos County was prepared by Nyhan et al., 1978. This soil survey classifies the soils according to the soil series, soil type, and soil phase.

The principal parent materials of about 95 percent of the Los Alamos County soils are Bandelier Tuff, volcanic rocks of the Tschicoma Formation, volcaniclastic sedimentary rocks of the Puye Formation, basaltic rocks of Chino Mesa, and remnants of the El Cajete pumice. The remaining 5 percent of the soils were formed from colluvium, alluvium, andesitic rocks of the Paliza Canyon Formation, Cerro Rubio quartz latites, and tuffs associated with sediments of Cerro Toledo rhyolite. Textures of these soils range from very fine sandy loams and clay loams to gravelly, sandy loams and stony, silty clay loams.

A wide variety of soil types occurs at TA-16. These include: Typic Eutroboralfs (both clayey-skeletal and fine), Tocal very-fine sandy loam, Frijoles very-fine sandy loam, Pogna fine sandy loam, Totavi gravelly loam, Sanjue-Arriba complex, Carjo loam, and Rabbit-Tsankawi rock outcrop. These soil units grade into outcrops of Bandelier Tuff along margins of the mesa tops. The relationships of the slope, vegetation, and parent materials for some of these soils are shown on Figures 2-11 and 2-12. Soils are generally thicker in the western portions of TA-16. An impermeable clay layer zone often forms at the soil-tuff interface on the Pajarito Plateau (LANL, 1993a; Weir and Purtymun, 1962).

2.2.4 Geology

2.2.4.1 Regional Geology

The discussions of the regional geology, stratigraphy, structural geology, and ground water were extracted primarily from LANL's "Installation Work Plan for Environmental Restoration" (IWP) (LANL, 1993b). The IWP has been prepared in accordance with the Hazardous and Solid Waste Amendments Module VIII requirements of LANL's Hazardous Waste Facility Permit (New Mexico Environmental Improvement Division, 1989). One of the major components of the IWP is an installation description that provides information on current environmental conditions at LANL. The IWP is updated annually and submitted to NMED.

LANL is located on the Pajarito Plateau along the eastern flank of the Jemez Mountains, which are part of the Jemez volcanic field. The Jemez volcanic field consists of approximately 432 cubic miles of volcanic rocks that cover an area of over 30 miles east to west and 50 miles north to south. The volcanic rocks were erupted from numerous vents, including a large multistage caldera (Gardner et al., 1986). The Jemez volcanic field is located at the intersection of the Jemez lineament and the Rio Grande rift (Aldrich, 1986) (Figure 2-13).

About 1.5 and 1.13 million years ago, two major volcanic eruptions in the Jemez Mountains produced widespread and voluminous ash-flow sheets. These ash-flow sheets are the Otowi and Tshirege members of the Bandelier Tuff (Smith and Bailey, 1966; Spell et al., 1990). The

Pajarito Plateau morphology is dominated by a gently eastward-sloping surface dissected by numerous steep-sided canyons. The Otowi and Tshirege Members of the Bandelier Tuff were erupted concomitantly with the collapse of the Toledo and Valles calderas, respectively. Volcanism continued after the formation of the calderas, as evidenced by the extrusion of domes along ring fractures. The El Cajete pumice and Banco Bonito rhyolite flow comprise the latest eruption in the Jemez Mountains. This eruption occurred about 130,000 years ago (Gardner et al., 1986; Self et al., 1988). Solfataric and hot spring activity continue as vestiges of volcanic activity today, both within and outside of the Valles caldera (Goff et al., 1989).

The Pajarito Plateau is located in the western part of the Española basin of the Rio Grande rift, a major tectonic feature of the western United States. The eastern margin of the Española basin lacks distinct major faults, but faults of major vertical offset may exist within Precambrian rocks of the Sangre de Cristo uplift (Vernon and Riecker, 1989; Biehler et al., 1991). A prominent zone of major faults, which cuts Miocene to Quaternary rocks of the Jemez volcanic field, characterizes the western margin of the Española basin (Smith et al., 1970; Gardner and Goff, 1984; Goff et al., 1990). The location and development of the Jemez volcanic field was strongly influenced by these border faults (Gardner and Goff, 1984; Gardner et al., 1986).

Rocks exposed around the margins of and underlying the Española basin were deposited prior to the development of the Rio Grande rift. These rocks consist of Mississippian to Permian marine limestones, sandstones, and shales; Mesozoic marine to terrestrial sandstones and shales; and Eocene sandstones, shales, and freshwater limestones. Precambrian quartzite, granitic gneiss and schist, and greenstone are exposed in the cores of the flanking Sangre de Cristo, Nacimiento, and Brazos uplifts (Kelley, 1978) (Figure 2-13). Earliest sediments deposited in the Española basin are those of the Tertiary Abiquiu, Picuris, and Los Piños formations. These formations consist of tuffaceous sandstones and volcaniclastic conglomerates derived largely from volcanic highlands to the north and northeast. They range in age from about 28 to 17 million years old (Baldridge et al., 1980; May, 1984; Ingersoll et al., 1990).

2.2.4.2 Site-Specific Geology

TA-16 is located in the western part of the Pajarito Plateau (Figure 2-14), which forms an apron of volcanic and sedimentary rocks around the eastern flanks of the Jemez Mountains. The plateau is aligned approximately north-south and is about 20 to 25 miles in length and 5 to 10 miles wide. It is bounded on the east by White Rock Canyon (which contains the Rio Grande), on the north and northeast by the Puye escarpment, and on the west by Sierra de los Valles. The Pajarito Plateau slopes gently eastward from an elevation of about 7,500 feet

near the mountains toward the Rio Grande, where it terminates at an elevation of about 5,400 feet in steep slopes and cliffs formed by downcutting of the river. The plateau has been dissected into a number of narrow mesas by southeastward-trending streams. TA-16, located on an unnamed mesa due east of the Jemez Mountains, is comprised primarily of welded Bandelier tuff. Cañon de Valle, north of TA-16, is a tributary to Water Canyon, which heads in the Jemez Mountains and extends to the Rio Grande. Both canyons have steep walls; Water Canyon is as much as 200 ft deep in the TA-16 area. Water Canyon cuts the Bandelier Tuff along much of its length, the Cerros del Rio basalts in its eastern portion, and Tschicoma Formation dacites in its western portion. Thus, natural metal background in the canyon drainages will reflect the variety of trace elements typical of volcanic tuffs, dacites, and basalts. Both Cañon de Valle and Water Canyon are characterized by ephemeral and intermittent runoff of both snowmelt and rainwater. Smaller surface drainages on the TA-16 mesa top are generally oriented north, south, or east, and feed the two larger canyons.

The stratigraphy and structural features of the Pajarito Plateau are described in the following sections.

2.2.4.2.1 Stratigraphy

The mesas of the Pajarito Plateau, comprised primarily of Bandelier tuff, are covered by a veneer of soils and alluvial deposits and are underlain by a sequence of sedimentary and volcanic rocks typical of a terrain produced by concurrent sedimentation and volcanism (Figure 2-15). The oldest unit exposed around the margins of the Pajarito Plateau and penetrated by water-supply wells is the Miocene and early Pliocene age Santa Fe Group. The Santa Fe in this area is a thick series of terrestrial conglomerates, sandstones, and mudstones with minor limestones, evaporites, volcanic tuffs, and intercalated basalts. Most production from water wells at Los Alamos is from the Santa Fe Group (Purtymun, 1984). Sedimentary rocks usually dominate the Santa Fe, although basalts constitute up to 45 percent of the section penetrated by water-supply wells at LANL (Purtymun et al., 1984). In the Española basin and underlying the northern part of Los Alamos County, the Santa Fe is subdivided into two formations, the Tesuque and the Chamita. Several members of the Tesuque and the Chamita Formations reflect the diversity of the coalesced alluvial fans deposited in the Española basin (Ingersoll et al., 1990). Early investigators inferred that all Santa Fe rocks exposed around the flanks of the Pajarito Plateau and intersected by water-supply wells beneath the plateau belonged to the Tesuque Formation, although more recent investigations suggest that some of the upper Santa Fe is Chamita Formation (Turbeville et al., 1989).

Interfingering with the Santa Fe Group are the volcanic rocks of the Tschicoma Formation. This formation consists of a sequence of dacitic domes and lavas that were erupted from vents in the central to northeastern Jemez Mountains between about 7 and 3 million years ago (Gardner et al., 1986). These volcanic rocks outcrop extensively in the mountains immediately west of LANL. They are reported in the subsurface beneath the western and southern part of the LANL boundary (Dransfield and Gardner, 1985).

Overlying the Santa Fe Group and interfingering with the Tschicoma Formation are the rocks of the Puye Formation. The Puye consists of a Pliocene-to-Pleistocene fanglomerate that was shed eastward from Tschicoma volcanic centers in the northeastern Jemez volcanic field between about 4 and 1.7 million years ago. Earlier workers (e.g., Griggs and Hem, 1964) included the Totavi Lentil, now considered a separate formation, as part of the Puye. Most of the Puye conglomerates contain cobbles of dacite and andesite in a volcanic sand matrix. The Puye includes stream-flow deposits, debris-flow deposits, volcanic-ash and block-flow deposits, and ash-fall and pumice-fall deposits (Waresback and Turbeville, 1990). It is best exposed north of LANL; however, lithologically similar rocks have been penetrated in drill holes as far south as Frijoles Mesa (Dransfield and Gardner, 1985). The Puye is interstratified with basalts of the Cerros del Rio volcanic field under parts of LANL. In Los Alamos water-supply wells, the top of the main aquifer is usually within the Puye.

Immediately beneath the fanglomerates of the Puye Formation and unconformably overlying the Santa Fe Group is a section of poorly consolidated fluvial gravels. Griggs originally named this unit the Totavi Lentil of the Puye Formation (Griggs and Hem, 1964). The gravels contain clasts that include abundant well-rounded cobbles and boulders of quartzite, granite, and pegmatite that differ lithologically from those in the Puye, including abundant well-rounded cobbles and boulders of quartzite, granite, and pegmatite that record a source area distant from the Jemez Mountains. This unit probably represents axial channel gravels of an ancestral Rio Grande. Waresback and Turbeville (1990) redefined these fluvial gravels as a separate formation, the Totavi Formation. The Totavi includes lacustrine sediments that are complexly interstratified with the upper Puye Formation. The Totavi was reported in some water-supply wells beneath LANL between the Santa Fe and the Puye, occurring at lower elevations in the eastern wells (Cooper et al., 1965; Purtymun et al., 1983; Purtymun et al., 1984). The presence of the Totavi at these levels suggests that river gravels of the Rio Grande were deposited on erosional surfaces. This setting is analogous to Quaternary terraces of the Rio Grande in the Española basin described by Dethier et al. (1988) before deposition of the Puye fans, which unconformably overlie older formations.

Overlying and interfingering the Totavi and Puye Formations are the basaltic flows, breccias, and scoria of the Cerros del Rio basalts. This formation occurs in the subsurface beneath much of the Pajarito Plateau (Dransfield and Gardner, 1985) and outcrops in the east and southeast parts of Los Alamos County (Griggs and Hem, 1964). These volcanic rocks are associated with the Pliocene-to-Pleistocene Cerros del Rio basalt field, east of the Rio Grande. Rocks from this field have been dated at 4.6 to 2.0 million years old (Gardner et al., 1986) and the youngest lava flows occurred between 1.5 and 1.13 million years ago. Part of this volcanic field is also known as basaltic rocks of Chino Mesa (Griggs and Hem, 1964). The top of the main aquifer beneath LANL is locally within this section of basaltic rocks.

In the subsurface beneath much of the Pajarito Plateau and in outcrops in many of the canyons, the Otowi Member of the Bandelier Tuff underlies the Tshirege Member (Griggs and Hem, 1964). The Otowi Member is mostly a nonwelded ash-flow tuff (ignimbrite) that was erupted from the Jemez Mountains approximately 1.5 million years ago (Spell et al., 1990). It is highly porous, poorly indurated, and composed of multiple flow units. Cooling joints are typically absent in outcrops because of relatively low emplacement temperatures and the lack of induration. Generally the Guaje Pumice Bed occurs at the base of the Otowi Member. The Guaje consists of sorted pumice fragments that average from 0.8 to 1.6 inches in size (Crowe et al., 1978). An interbedded sequence of rhyolitic tuffs and sediments commonly occurs between the Otowi and Tshirege Members of the Bandelier Tuff. The rhyolitic tuffs were erupted between 1.5 and 1.2 million years ago, predominantly from the Cerro Toledo domes in the northeastern Jemez Mountains (Heiken et al., 1986). Beneath the Pajarito Plateau, the sediments are epiclastic sands and sandy gravels that resemble Puye Formation fanglomerates lithologically. Deposits in this interval at LANL have sometimes been referred to as "Tsankawi pumice" or the "Tsankawi member."

The Tshirege Member of the Bandelier Tuff is the most widespread rock unit on the Pajarito Plateau (Griggs and Hem, 1964). The Tshirege was erupted from the Valles caldera about 1.13 million years ago (Spell et al., 1990). It is composed of multiple flow units of crystal-rich ignimbrite, which displays significant variations in welding and alteration, both in a single stratigraphic section and with varying distance from the caldera. To the west, individual units tend to be thicker and more welded. Flow units are locally separated by volcanic surge deposits of well-sorted, fine-grained, cross-bedded crystal and pumice fragments. Vapor-phase alteration occurs in much of this unit. Often, the base of the Tshirege is marked by 1.5 to 10 ft of bedded, unconsolidated, pumice-rich ash-fall tuff of Tsankawi pumice (Bailey et al., 1969;

Crowe et al., 1978). In ash-flow tuffs, cooling joint spacing varies primarily with the thickness of the unit, emplacement temperature, substrate temperature, and topography. Joint density tends to be greatest in welded tuff and least in nonwelded tuff. Hydraulic conductivities are generally greatest in the fractured, welded parts of ash-flow tuffs and least in the nonwelded parts (Crowe et al., 1978).

2.2.4.2.2 Structural Geology

The Pajarito fault system forms the western margin of the Española basin. This fault system exhibits Holocene movement and historic seismicity (Gardner and House, 1987; Gardner et al., 1990). The fault system is made up of over 65 miles of mapped fault traces. It connects with regional structures that extend at least as far as Cochiti to the south and Taos to the northeast (Gardner and House, 1987).

Within Los Alamos County, the Pajarito fault system consists of a number of active or potentially active faults, including the Pajarito, Rendija Canyon, and Guaje Mountain faults (Figure 2-16). The Pajarito fault is a zone of faulting that is greater than 0.25 mile wide. Its major scarp forms the western boundary of LANL. Near the southwestern corner of LANL's boundary, the major scarp of the Pajarito fault is over 410 ft high in rocks about 1 million years old. Movement on this fault segment is normal-oblique. The eastern side of the fault is relatively downdropped. Where exposed north of Los Alamos Canyon, the Rendija Canyon and Guaje Mountain faults are characterized by zones of gouge and breccia ranging from 100 to 150 ft wide. The Rendija Canyon and Guaje Mountain faults produce visible offsets of stratigraphic horizons; both are dominantly normal-oblique faults whose west sides are downdropped. Some strike-slip movements on the Guaje Mountain fault segment have been noted (Wachs et al., 1988; Aldrich and Dethier, 1990; Gardner et al., 1990). The youngest movements on the Guaje Mountain fault have been constrained between roughly 4,000 and 6,000 years (Gardner et al., 1990). Displacement on the Guaje Mountain and Rendija Canyon faults apparently decreases south of Los Alamos Canyon, where narrow zones of faulting are replaced by over 300-ft-wide zones of intense brecciation and fracturing superimposed on the network of cooling joints in the Bandelier Tuff (Vaniman and Wohletz, 1990).

A variety of data have been integrated to produce structure contour and paleogeologic maps of the pre-Bandelier Tuff surface beneath the Pajarito Plateau (Dransfield and Gardner, 1985). These maps indicate that subsurface rock units are cut by a series of down-to-the-west normal faults. However, the overlying Bandelier Tuff is not obviously displaced by these buried faults. Detailed fracture studies have shown that fracture abundances and apertures increase in the Bandelier Tuff over some of the buried fault projections (Vaniman and Wohletz, 1990).

2.2.5 Ground Water

In the Los Alamos area, ground water occurs in three modes: (1) water in shallow alluvium in some of the larger canyons; (2) as perched water (a ground-water body above a less permeable layer that separates it from the underlying main aquifer by an unsaturated zone); and (3) the main aquifer of the Los Alamos area.

Alluvium in canyons that head on the Pajarito Plateau is relatively fine-grained and consists of clays, silts, sands, and gravels derived from the Bandelier Tuff. Saturated hydraulic conductivity of the alluvium ranges from 10^{-2} centimeters per second (cm/s) for sand to 10^{-4} cm/s for silty sand (Abeele et al., 1981). Ephemeral runoff in some canyons infiltrates the alluvium until downward movement is impeded by the less permeable tuff and sediments. The impeded movement results in a buildup of a shallow alluvial ground-water body. The horizontal and vertical extent of the alluvial water is limited through depletion by evapotranspiration and by limited movement into the underlying rocks (Purtymun et al., 1977). The limited saturated thickness and extent of the alluvial ground water preclude its use as a viable source of municipal and industrial supply to LANL and the surrounding community.

Perched ground-water bodies occur at intermediate depths in the conglomerates and basalts beneath the alluvium in portions of Pueblo, Los Alamos, and Sandia Canyons. Depth to perched water ranges from about 90 ft in the midreach of Pueblo Canyon to about 450 ft in lower Sandia Canyon. Water from the Pueblo Canyon perched aquifer discharges at Basalt Spring in lower Los Alamos Canyon. Recent tritium measurements of intermediate depth perched ground water from four locations in Pueblo and Los Alamos Canyons indicate that recharge to these depths has occurred during the last several decades (Gallaher, 1995).

The only aquifer of the Pajarito Plateau capable of providing a large-scale municipal and industrial water supply is in rocks of the Santa Fe Group and Puye Formation. The upper surface of this aquifer rises westward from the Rio Grande through the Santa Fe and into the lower part of the Puye beneath the central and western parts of the plateau (Figure 2-17). The exact source of recharge to the main aquifer is unknown. Three sources of recharge have been suggested by Cushman (1965): infiltration of runoff in canyons, underflow from the Valles caldera through the Tschicoma Formation, and infiltration on mesas. A large quantity of hydrologic, structural, and geochemical data indicate, however, that the caldera may not serve as an appreciable source of recharge to the main aquifer (Conover et al., 1963; Griggs and Hem, 1964; Goff, 1991). Furthermore, natural recharge through undisturbed Bandelier Tuff on the mesa tops is believed to be insignificant (Purtymun and Kennedy, 1971; Kearl et al., 1986).

Limited data exist to support an evaluation of canyon runoff and alluvial water as a recharge source. Recent work using tritium and carbon-14 as hydrologic tracers indicates that some downward movement of moisture occurs beneath the canyons (LANL, 1993b; LANL, 1994a) and that some recharge has occurred at three locations (i.e., Los Alamos, Mortandad, and Pueblo Canyons) over the last four decades (Gallaher, 1995). Investigations are continuing to further evaluate the possible pathways for tritium movement toward the main aquifer. Water-level elevations suggest that ground water flows from the Jemez Mountains east and east-southeast toward the Rio Grande, where a part is discharged into the river through seeps and springs (Purtymun et al., 1980) (Figure 2-17). It is inferred that major recharge occurs from the west because the piezometric surface slopes downward to the east. The ground-water flow rate ranges from 20 feet per year (ft/yr) in the Tesuque Formation to 345 ft/yr in the more permeable Puye (Purtymun, 1984).

Figure 2-17 shows contours drawn to depict the piezometric surface of the main aquifer. The hydraulic gradient of the aquifer averages about 60 to 80 ft per mile within the Puye but increases to 80 to 100 ft per mile along the eastern edge of the plateau as the water enters the Santa Fe. The depth to the water table under LANL ranges from about 600 to 1,200 ft. The wells in the main aquifer near the Rio Grande exhibit artesian conditions.

As expected, wells completed in the high permeability sediments and volcanics of the Santa Fe Group and Puye Formation are very productive. Wells located in the eastern well field, which penetrates about 1,600 ft of the fine-grained sediments of the Santa Fe, yield an average of 500 gallons per minute (gpm) with a specific capacity of 8 gpm per foot of drawdown. Wells in the central part of the plateau, which are completed in the Puye and coarser sediments of the Santa Fe, are higher yielding and average 1,000 gpm, with a specific capacity of about 35 gpm per foot of drawdown.

Water-balance calculations for the LANL area indicate that the annual evapotranspiration rate exceeds the annual precipitation rate. Additionally, field investigations have shown that infiltration of precipitation into the Bandelier Tuff is essentially zero. At depths below 10 ft, the volumetric moisture content of the tuff at LANL varies from about 4 to 6 percent on the mesas and from approximately 6 percent to saturation in the canyons with perched aquifers. In canyons where no perched aquifers are present, the volumetric moisture content of the tuff at depths below ten feet ranges from about 4 to 10 percent. If sufficient moisture is present to permit migration of moisture, unsaturated flow would be the predominant mechanism of

movement in the Bandelier Tuff. If insufficient moisture is present, vapor-phase transport appears to be the predominant mechanism of movement.

Ground-water Monitoring [20 NMAC 4.1, Subpart IX, 270.14(c) and 20 NMAC 4.1, Subpart V, 264.90(a)]

Requirements for ground-water monitoring and protection specified in 20 NMAC 4.1, Subpart IX, 270.14(c), and 20 NMAC 4.1, Subpart V, 264.90(a), apply to owners and operators of the following "regulated units" only: surface impoundments, waste piles, land treatment units, and landfills. This permit application addresses open burn areas and a container storage area, which are not subject to 20 NMAC 4.1, Subpart IX, 270.14(c).

2.3 TRAFFIC PATTERNS [20 NMAC 4.1, Subpart IX, 270.14(b)(10)]

2.3.1 General

The rugged topography of alternating mesas and canyons present at LANL limits traffic circulation to only a few major arterial roads. A total of 85 miles of paved roads are present within LANL (Pan Am World Services Inc., 1986). The major roads are shown on Figure 2-8. There are 19 miles of highway, 22 miles of TA access roads, and 44 miles of roads in LANL's TAs.

The main access route to LANL is State Road 502 (formerly State Road 4). The majority of traffic to LANL approaches from the east on State Road 502. Alternate access routes are available from the south on State Roads 4 and 501 (West Jemez Road).

The pattern of east-west trending canyons at LANL prohibits north-south automobile travel in nearly all portions of LANL, with the exception of Diamond Drive. Los Alamos Canyon is spanned at Diamond Drive by an 820-foot-long steel-arch bridge that was completed in 1951. This bridge provides the main access between LANL facilities located on either side of Los Alamos Canyon.

Currently, over 12,000 people are employed at LANL (including full-time, part-time, and casual LANL personnel and subcontractors). Roughly 4,000 people commute to LANL daily from communities outside Los Alamos County.

2.3.2 Waste Collection Areas and Routes of Travel

The areas of waste collection and routes of travel for the TA-16 open burn and container storage operations are shown on Figures 2-8 through 2-10.

2.3.3 Traffic Volumes

According to a 1991 traffic study, the peak traffic periods are between 7:15 and 8:15 a.m., 12:20 and 1:20 p.m., and 4:25 and 5:25 p.m. (Los Alamos County, 1991). The 1991 traffic study was limited to the intersection of Diamond Drive and Trinity Drive, just north of the TA-3 area. Consequently, the data presented in the study should reflect the existing traffic conditions in the TA-3 area at LANL. TA-3 will typically have higher vehicular volumes than the rest of LANL; thus, this study provides a conservative estimate of facilitywide traffic volumes. Maps from the cited study depicting vehicular traffic-count movements at the intersection of Diamond and Trinity Drives are included in Appendix B. Based on the 1991 traffic study, the Diamond Drive and Trinity Drive intersection had a volume of 2,269 vehicles from 7:15 to 8:15 in the morning and 2,096 from 4:25 to 5:25 in the afternoon. The count is biased low since the northbound traffic from Diamond Drive turning east onto Trinity Drive was not tallied during this study. In addition, the count is biased low due to alternate routes being used while the Los Alamos Canyon bridge was being widened and improved.

Data from a traffic count conducted at the same intersection in September 1992 are also included in Appendix B (Los Alamos County, 1992). The traffic volume from 7:15 to 8:15 in the morning was 3,047 vehicles. From 4:30 to 5:30 in the afternoon, the volume was 3,313 vehicles. The traffic volumes from Diamond Drive turning east onto Trinity Drive was tallied in the 1992 study whereas it was not fully tallied in the 1991 study.

2.3.4 Traffic Control Signals

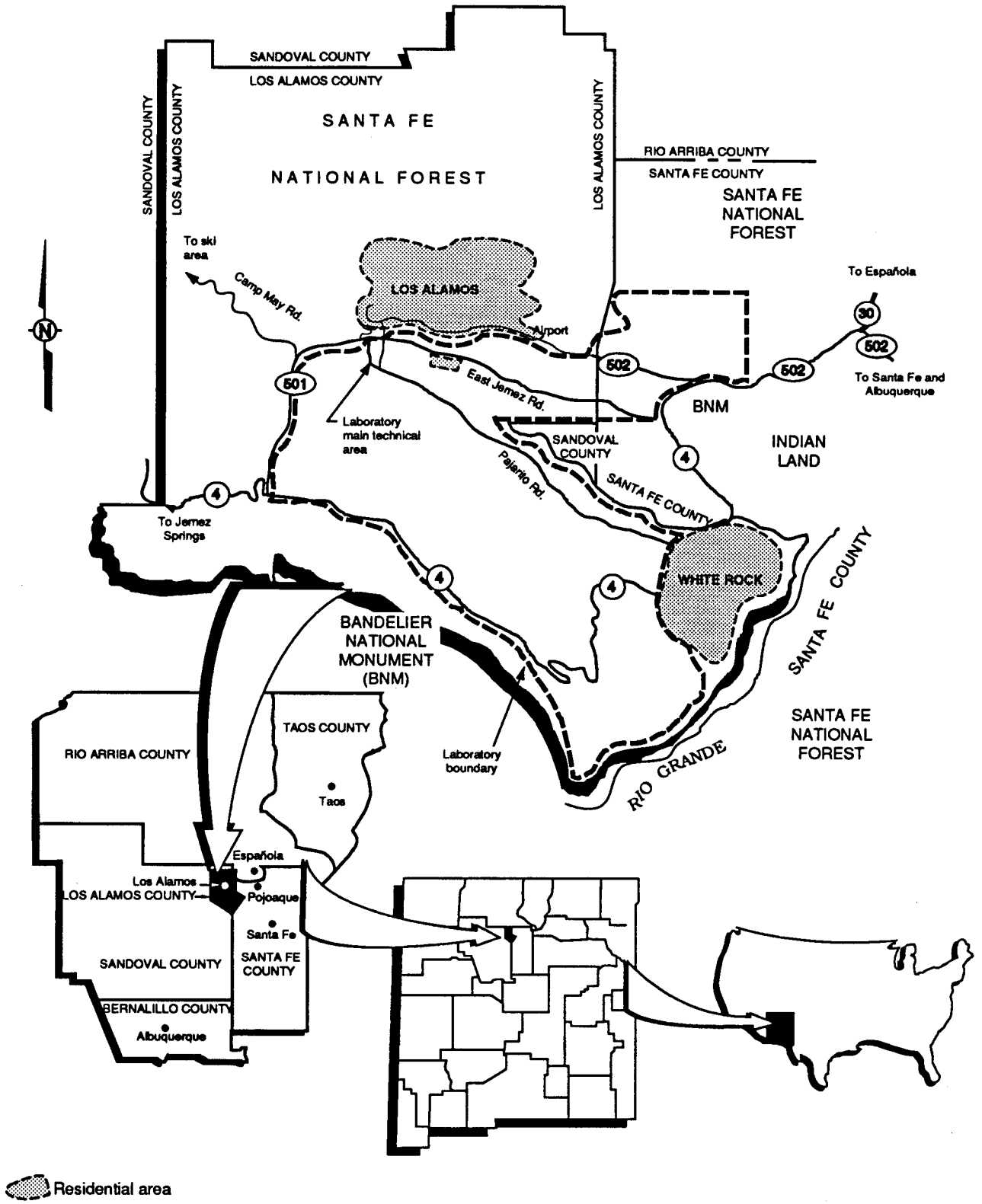
Sitewide traffic flow at LANL is controlled by traffic lights, stop signs, and yield signs. Traffic lights are in place at all major intersections. Traffic signs are used at "T" intersections throughout LANL. Access to the high-security TAs is controlled by security guards and is restricted to vehicles having specific identification. Only personnel having appropriate security clearance and identification or escorted visitors are allowed access to the secured TAs. Vehicles and personnel entering these TAs are subject to periodic search by security personnel.

Figures 2-9 and 2-10 show the major roads and traffic signals in the vicinity of TA-16-88 and the TA-16 burn ground.

2.3.5 Road Load-Bearing Capacity

Roads at LANL carrying the greatest traffic volumes include Diamond Drive, Pajarito Road, and East and West Jemez Roads. These roads were constructed with a 10-inch-thick base overlain with a 5-inch-thick asphaltic concrete surface. They were designed and built in conformance with American Association of State Highway Transportation Officials (AASHTO) specification

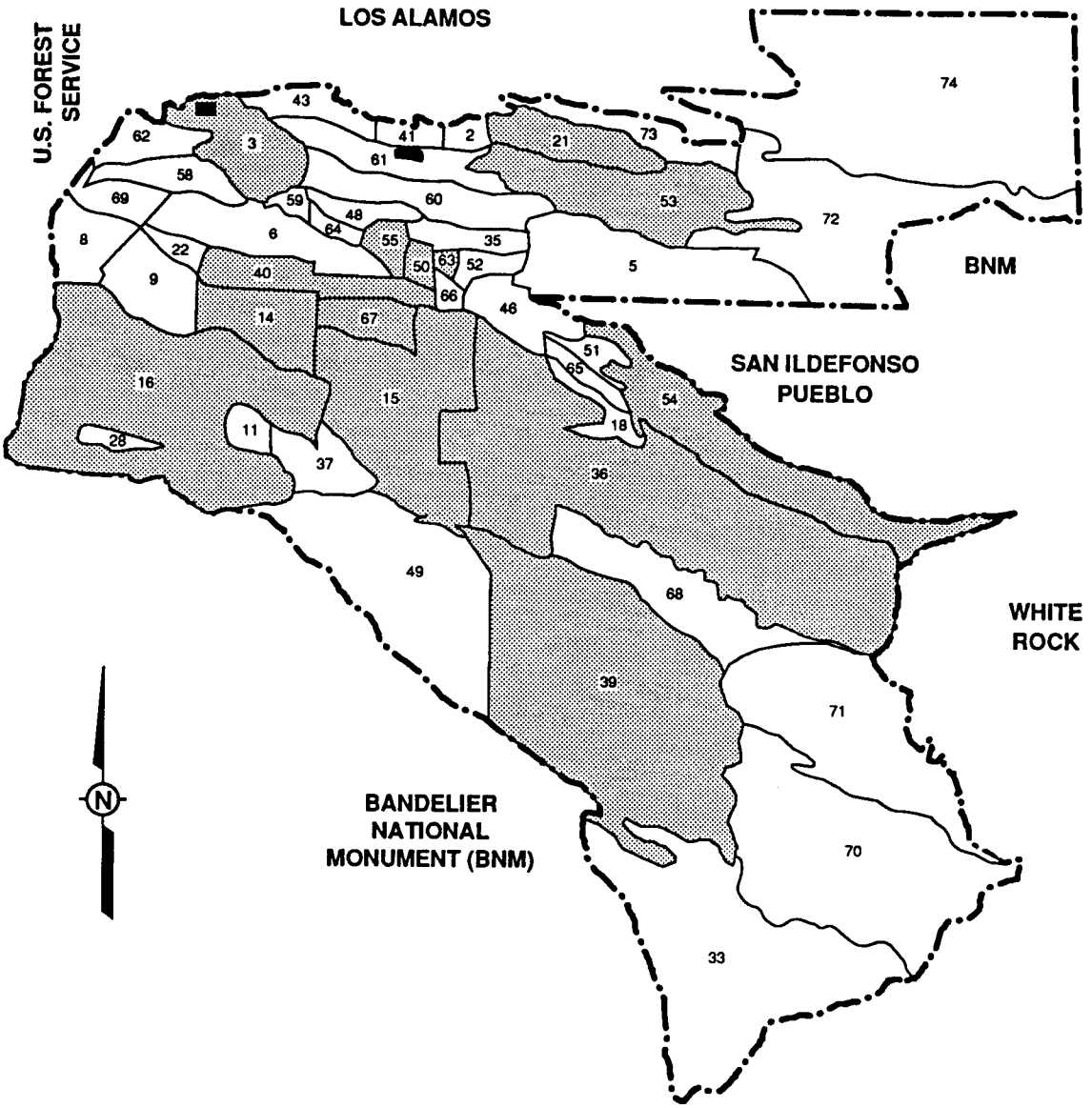
HS-20. This specification is intended to accommodate truck loading capacities of 32,000 pounds per axle. Roads within TAs are generally two-lane roads with asphalt surfaces. Roads within TA-16 were designed and constructed to meet AASHTO standards.



Modified from: "Environmental Surveillance at Los Alamos During 1992," 1994, LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 2-1

Regional Location Map of Los Alamos National Laboratory and Surrounding Land Use



Shading indicates technical areas at which hazardous waste or mixed waste units are located or planned for construction.

Not LANL property.

4800 0 4800
Scale in Feet

Note: Technical Area 57, the Fenton Hill Geothermal Site, is not shown on this figure.

Modified from Los Alamos National Laboratory, 1994, "Environmental Surveillance at Los Alamos During 1992," LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 2-2
Location Map of Los Alamos National Laboratory (LANL) Technical Areas

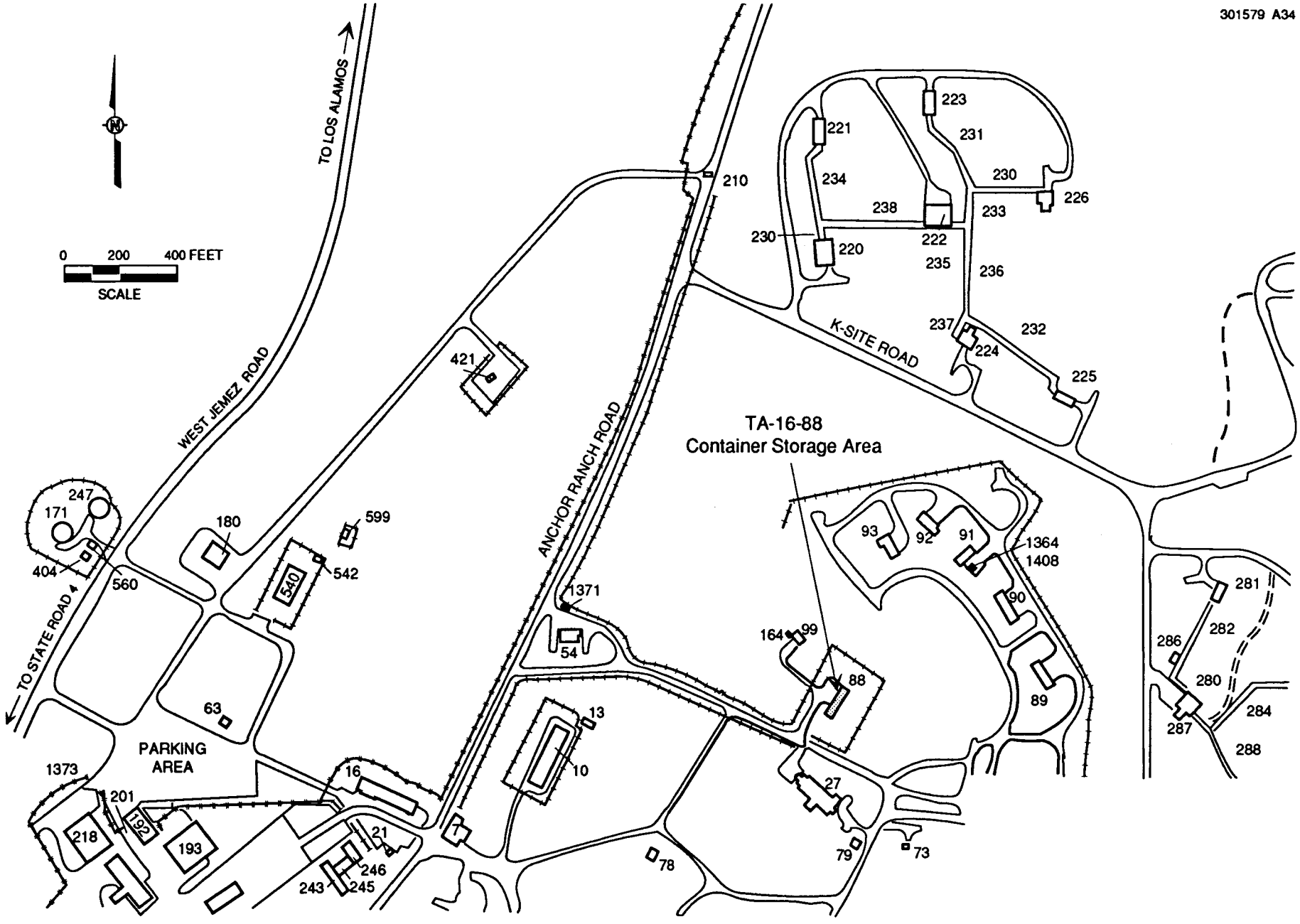


Figure 2-3
Site Location Plan for Technical Area (TA) 16, Building 88

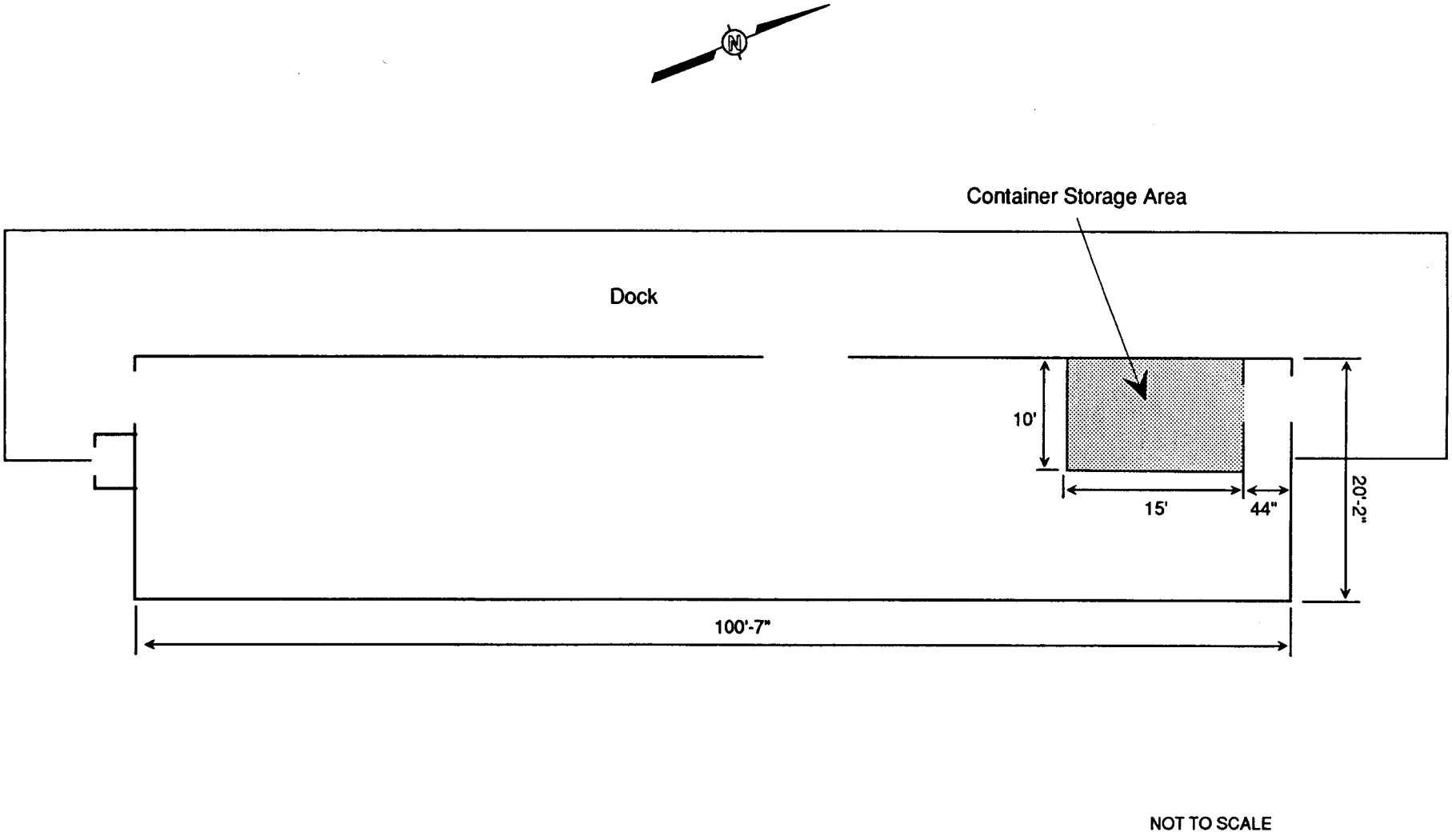
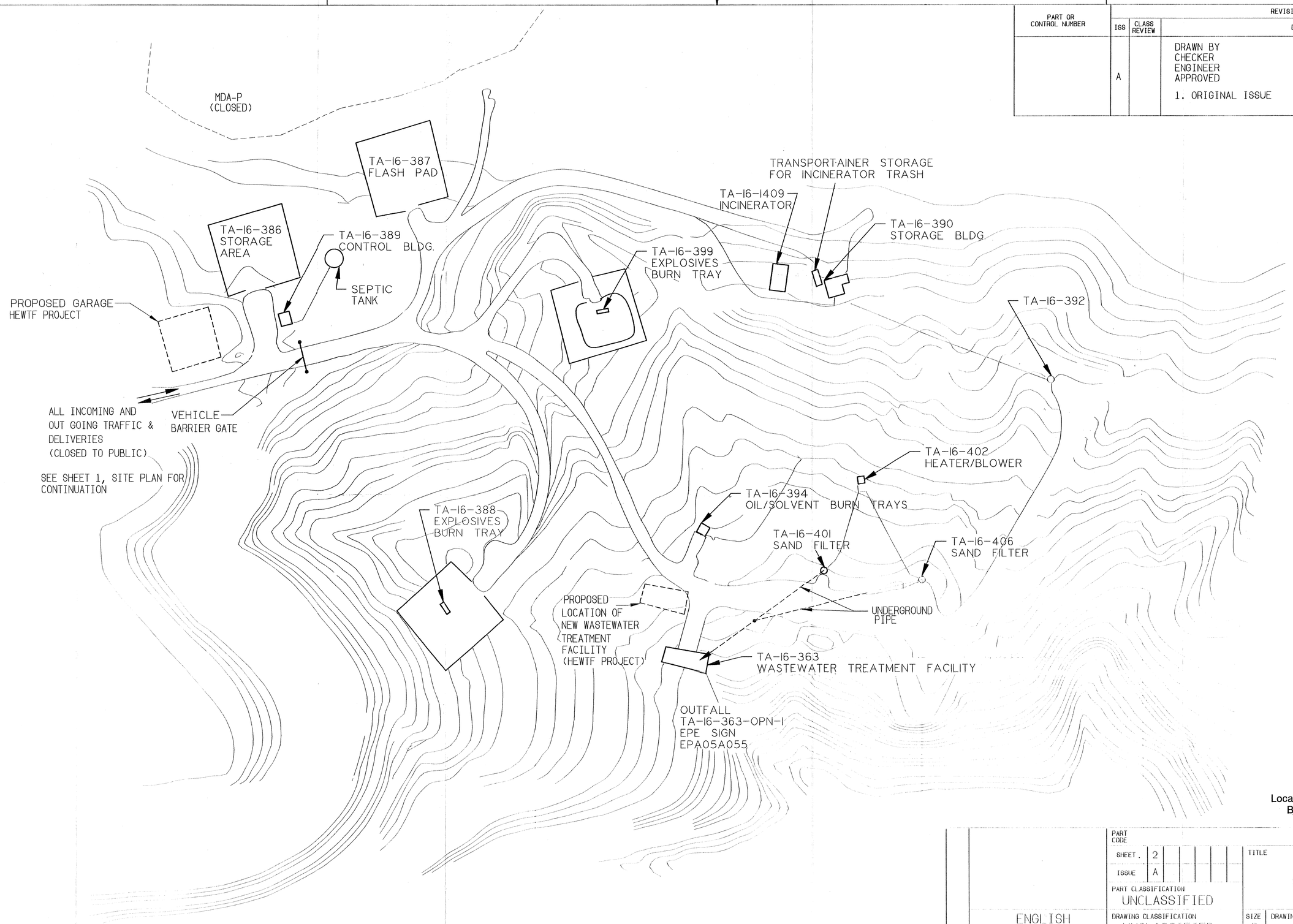


Figure 2-4
Technical Area 16, Building 88, Container Storage Area

PART OR CONTROL NUMBER	REVISIONS		
	ISS	CLASS REVIEW	DESCRIPTION
	A		DRAWN BY - H. KORHONEN 4-4-95 CHECKER - E. HYDE ENGINEER - E. HYDE APPROVED - 1. ORIGINAL ISSUE

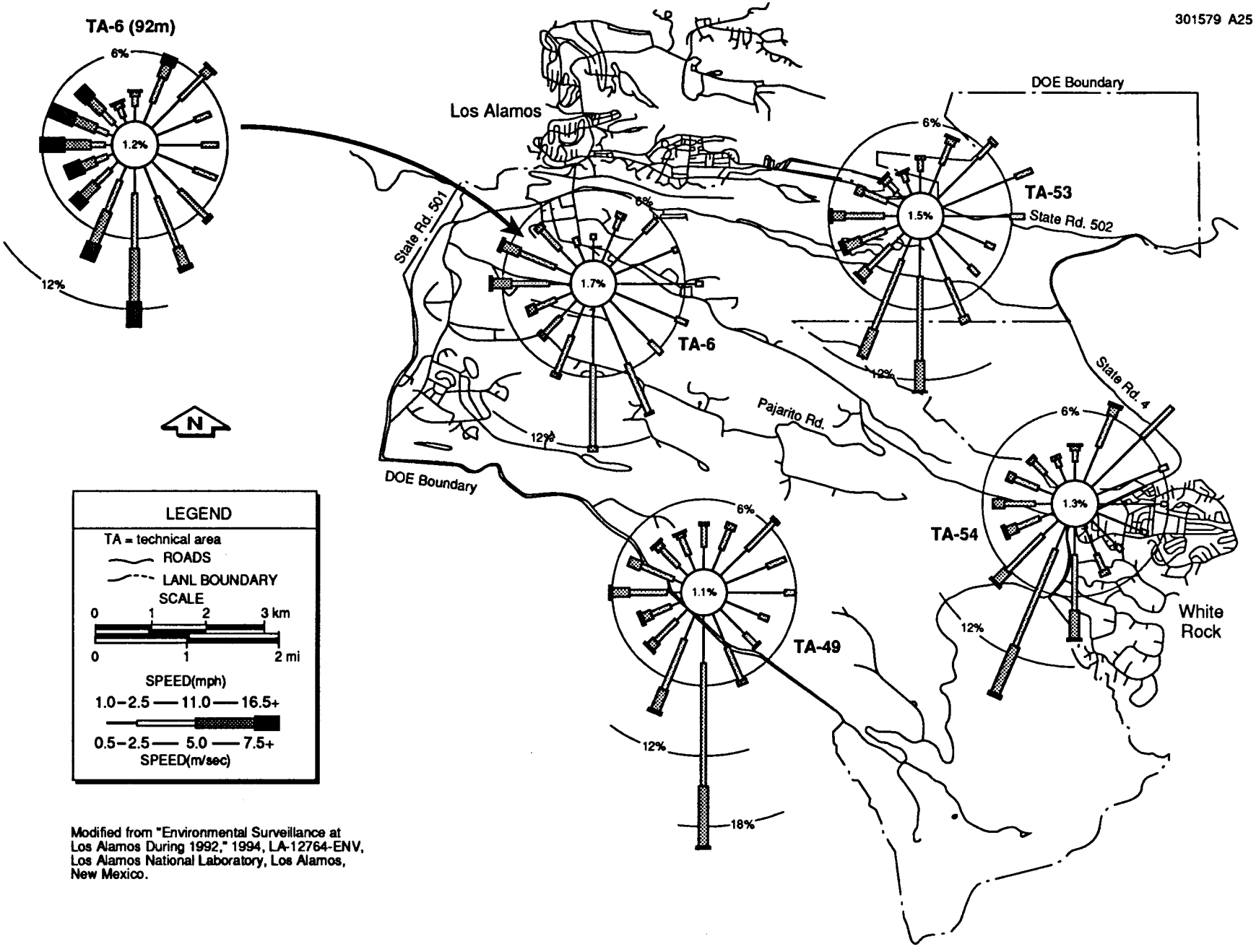


5973-E

Figure 2-5

Location Map of Technical Area (TA) 16
Burn Ground Site and Road Plan

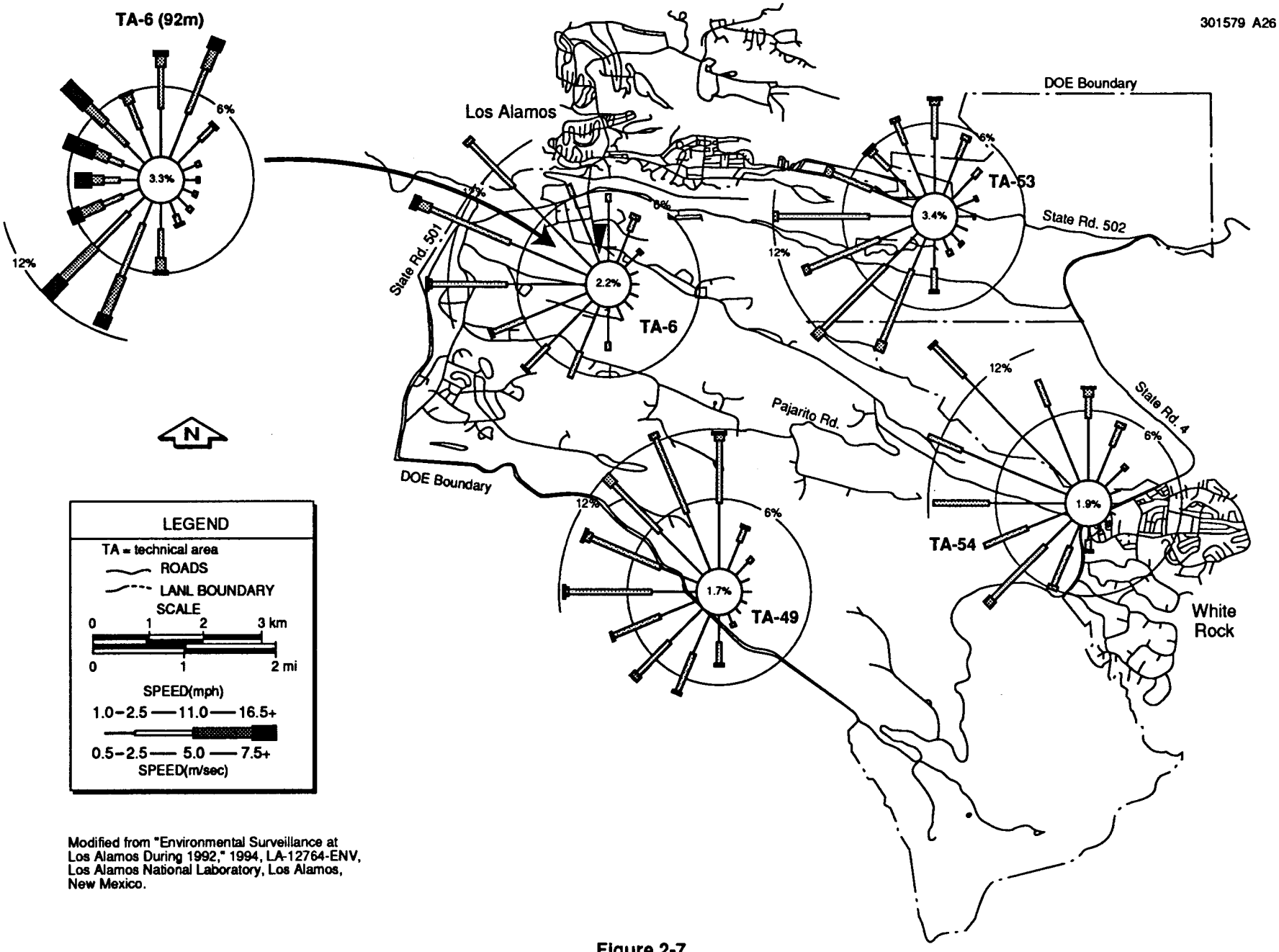
ENGLISH THIRD ANGLE PROJECTION	PART CODE SHEET 2 ISSUE A PART CLASSIFICATION UNCLASSIFIED DRAWING CLASSIFICATION UNCLASSIFIED STATUS RELEASED	TITLE (UNC) TITLE CLASSIFICATION BURN GROUND SITE AND ROAD PLAN TA-16 SIZE D DRAWING NUMBER 13Y-192374 CAGE 88516 SCALE N/A SHEET 2 OF ORIGIN LA-BRAVO-V4.0



Modified from "Environmental Surveillance at Los Alamos During 1992," 1994, LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 2-6

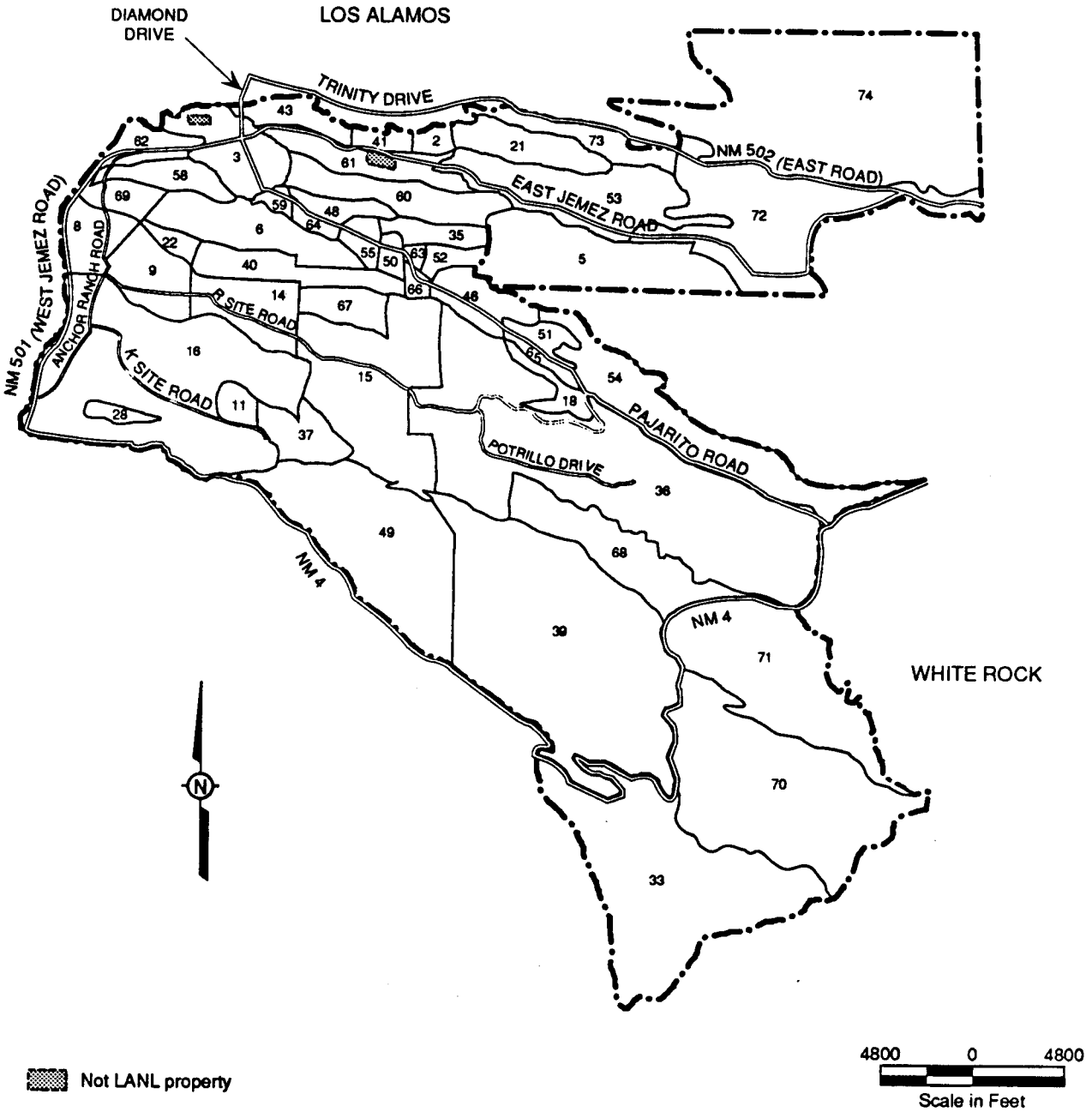
Annual Wind Roses for Los Alamos National Laboratory (LANL)—Day



Modified from "Environmental Surveillance at Los Alamos During 1992," 1994, LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 2-7

Annual Wind Roses for Los Alamos National Laboratory (LANL)—Night



Not LANL property

Modified from Los Alamos National Laboratory, 1994, "Environmental Surveillance at Los Alamos During 1992," LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 2-8

Major Roads and Primary Traffic Routes at Los Alamos National Laboratory (LANL)

301579 A31

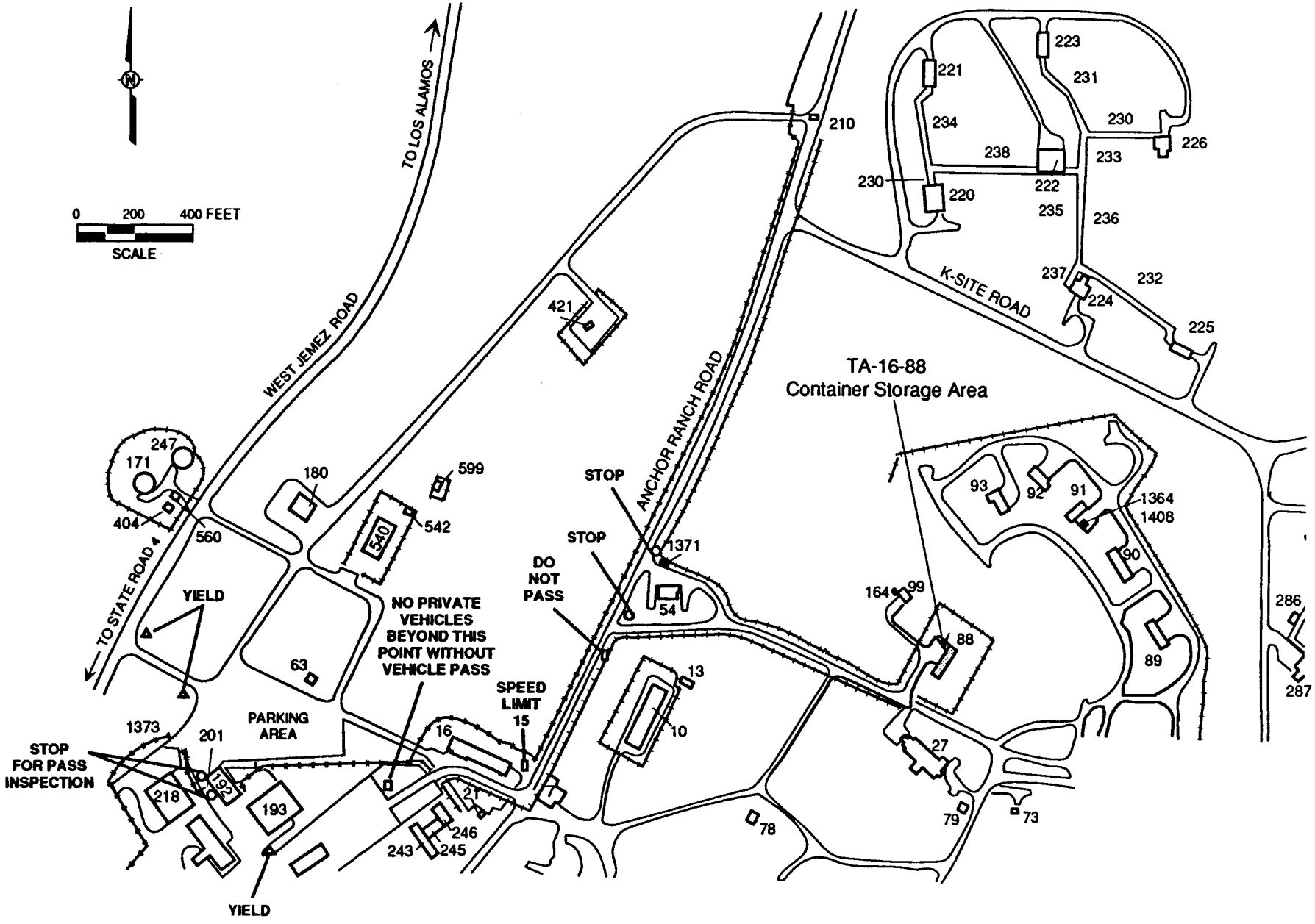


Figure 2-9

Location Map of Access Roads and Traffic Control Signs in the Vicinity of Technical Area (TA) 16, Building 88

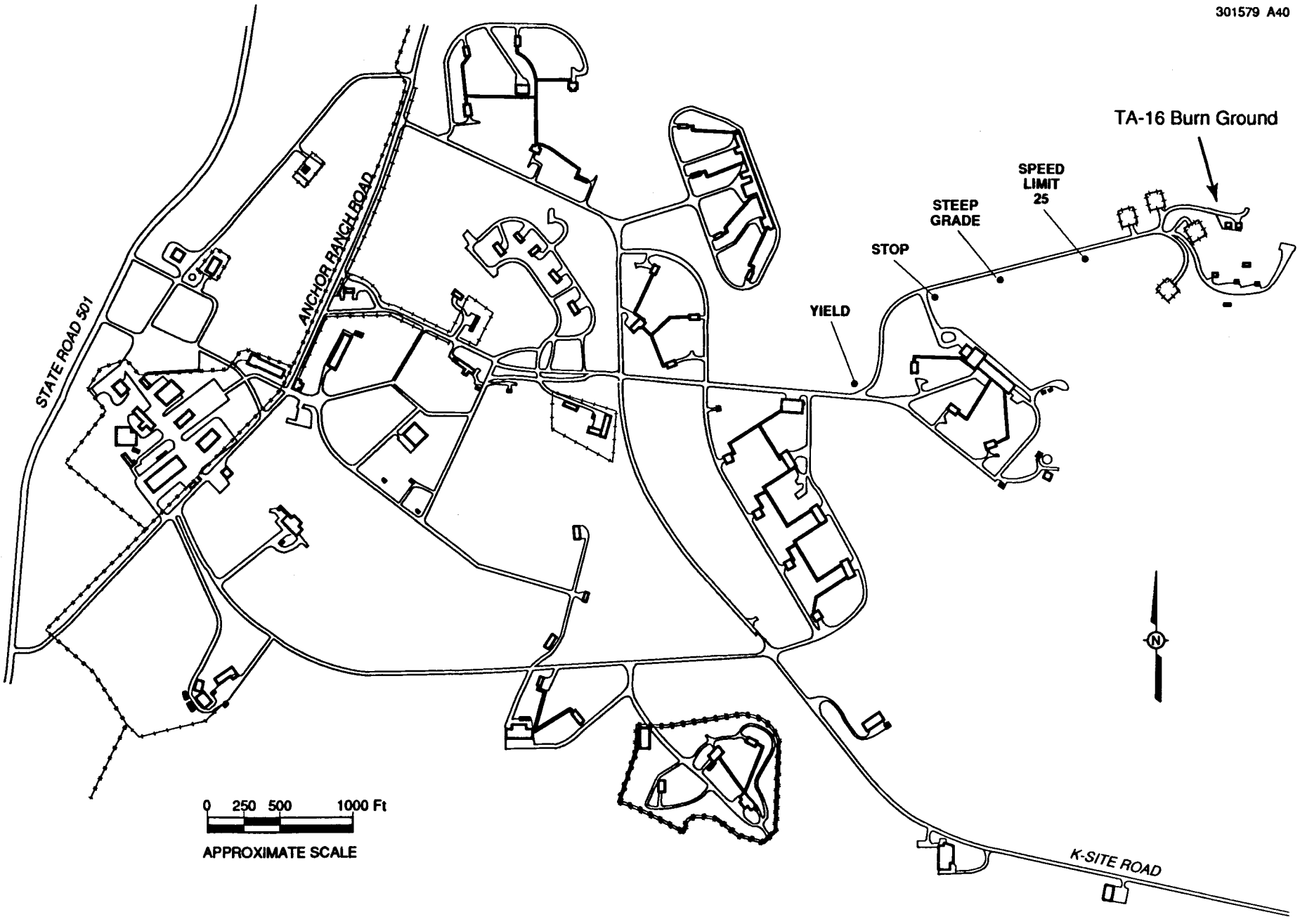
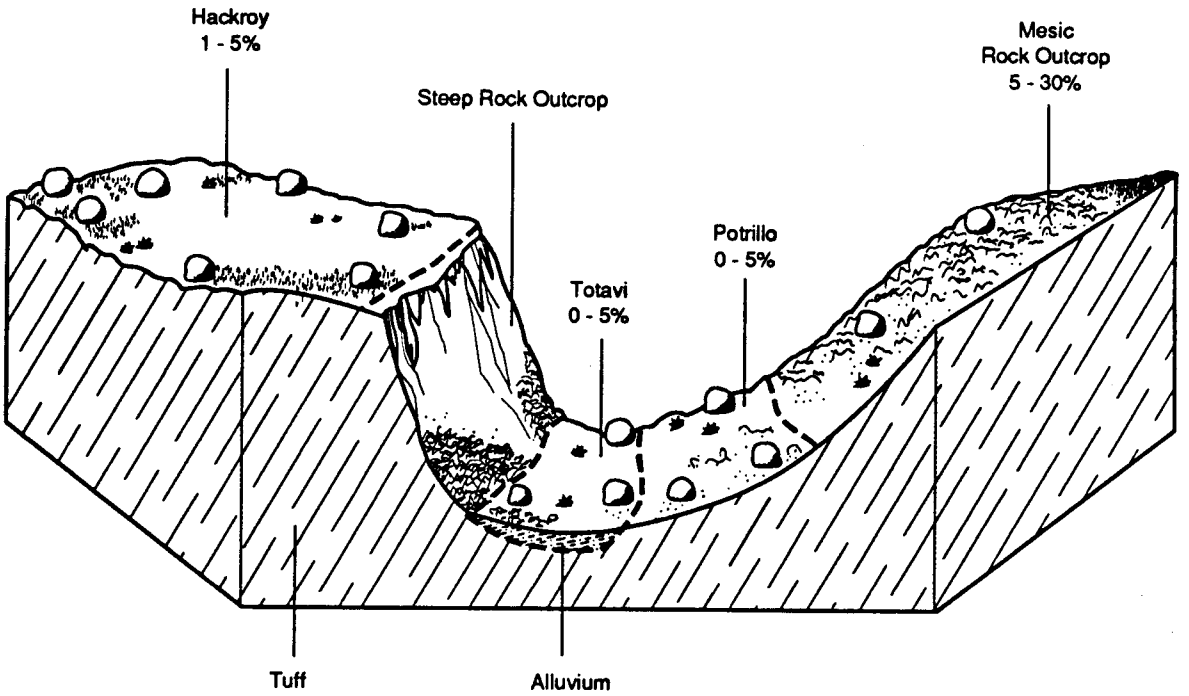
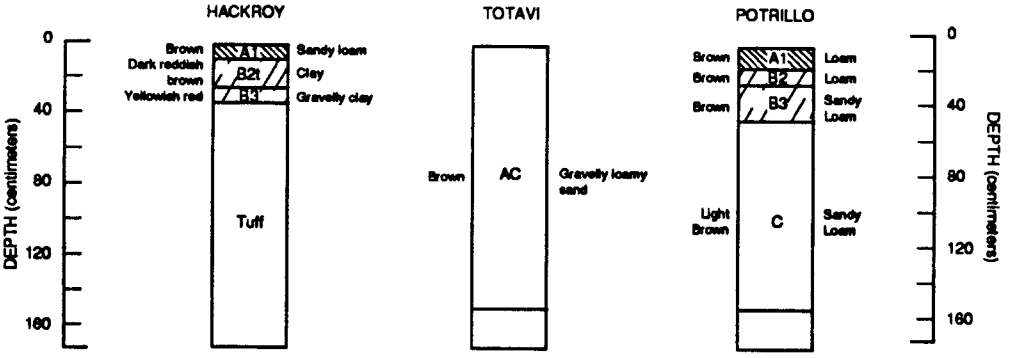


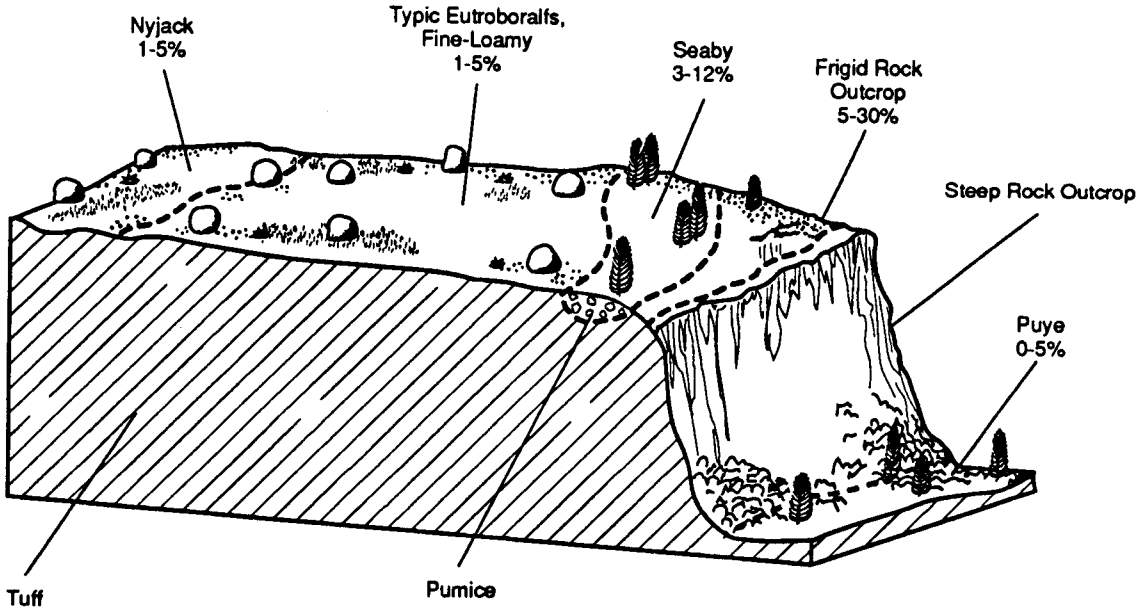
Figure 2-10
Location Map of Access Roads and Traffic Signs in the Vicinity of the Technical Area (TA) 16 Burn Ground

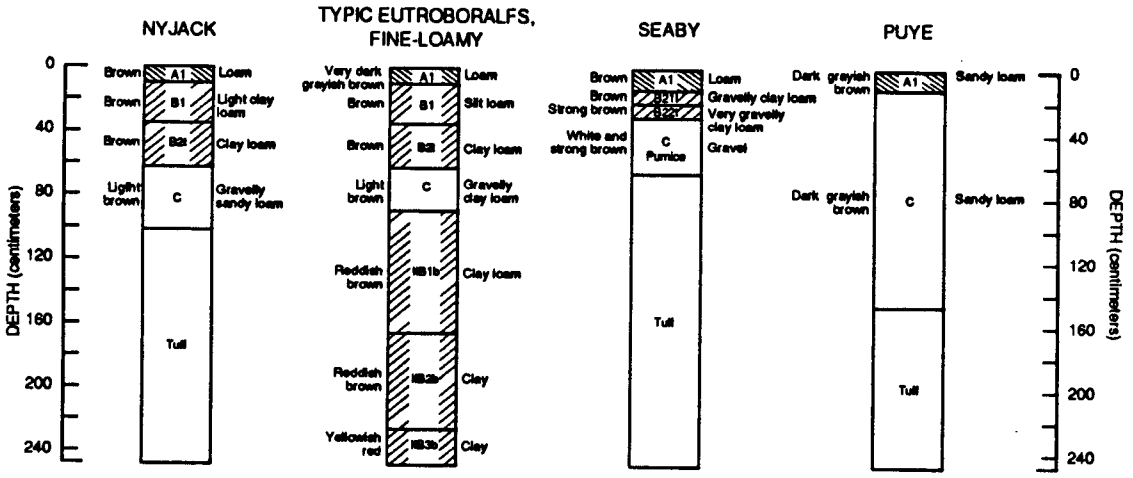




Reference: Nyhan et al., 1978, "Soil Survey of Los Alamos County, New Mexico," LA-6779-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 2-11
Relationship of Slope, Vegetation, and Parent Material to Hackroy, Totavi, and Potrillo Soils





Reference: Nyhan et al., 1978, "Soil Survey of Los Alamos County, New Mexico," LA-6779-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 2-12
Relationship of Slope, Vegetation, and Parent Material to Nyjack, Typic Eutroboralfs, Fine-Loamy, Seaby, and Puye Soils

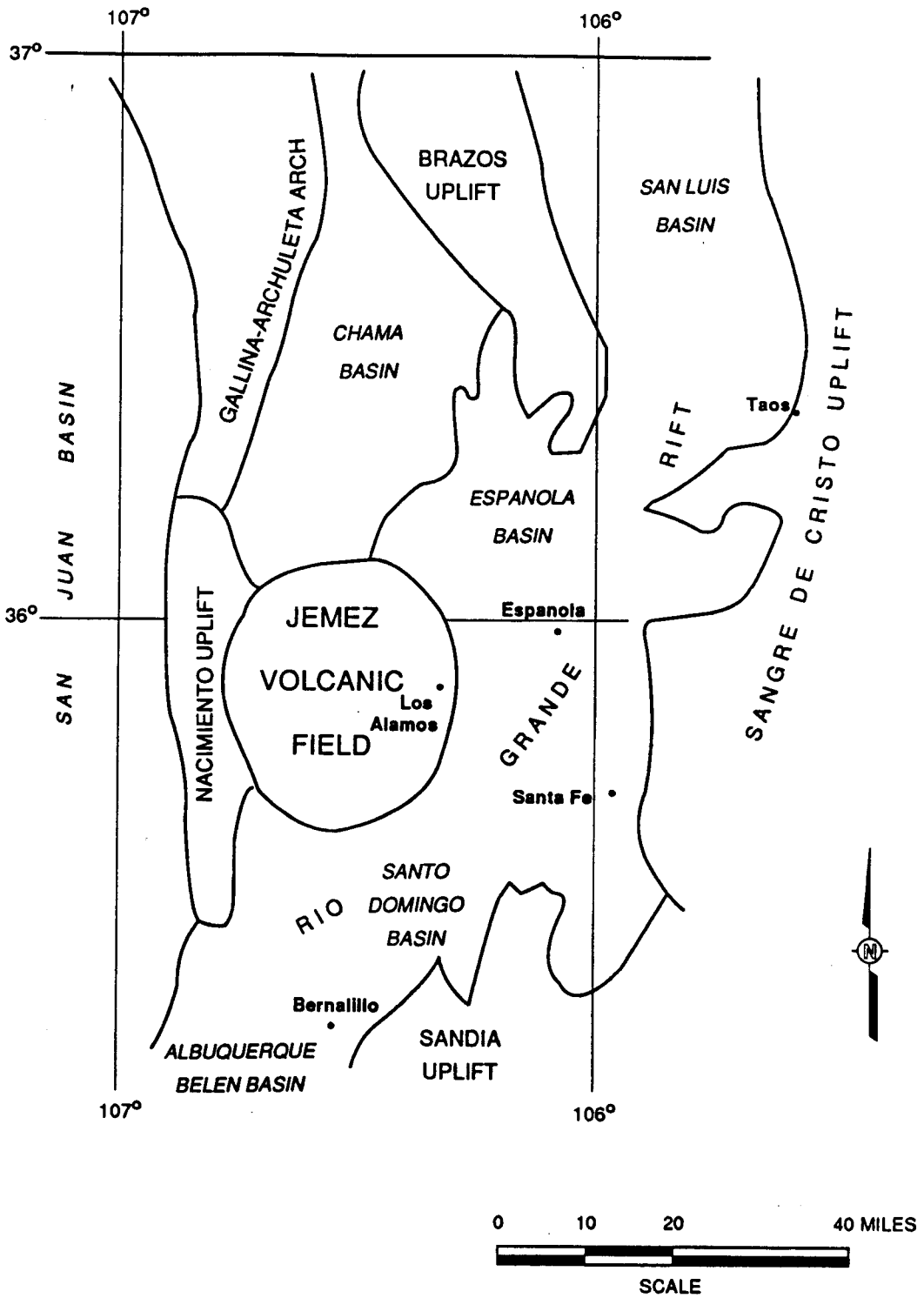
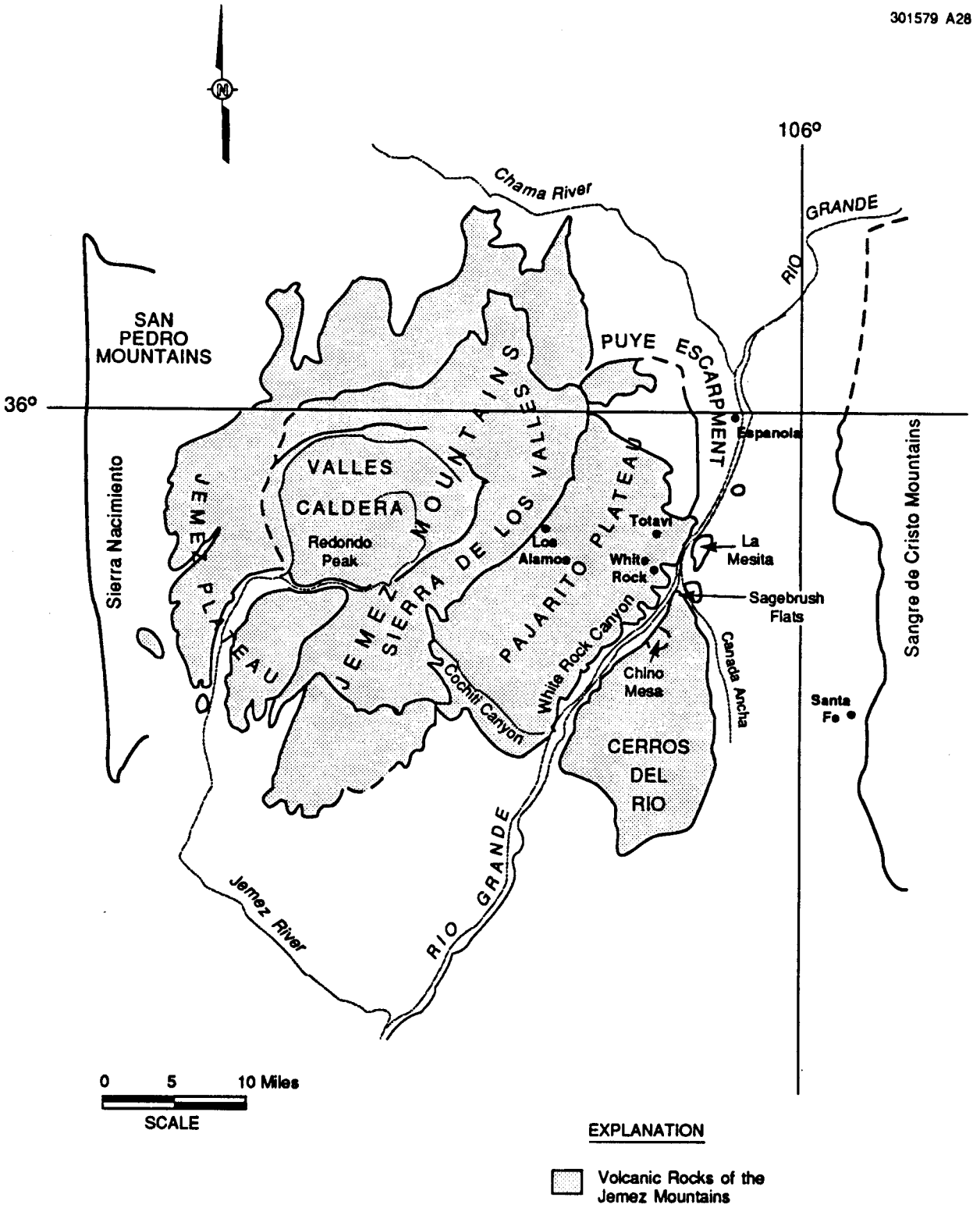


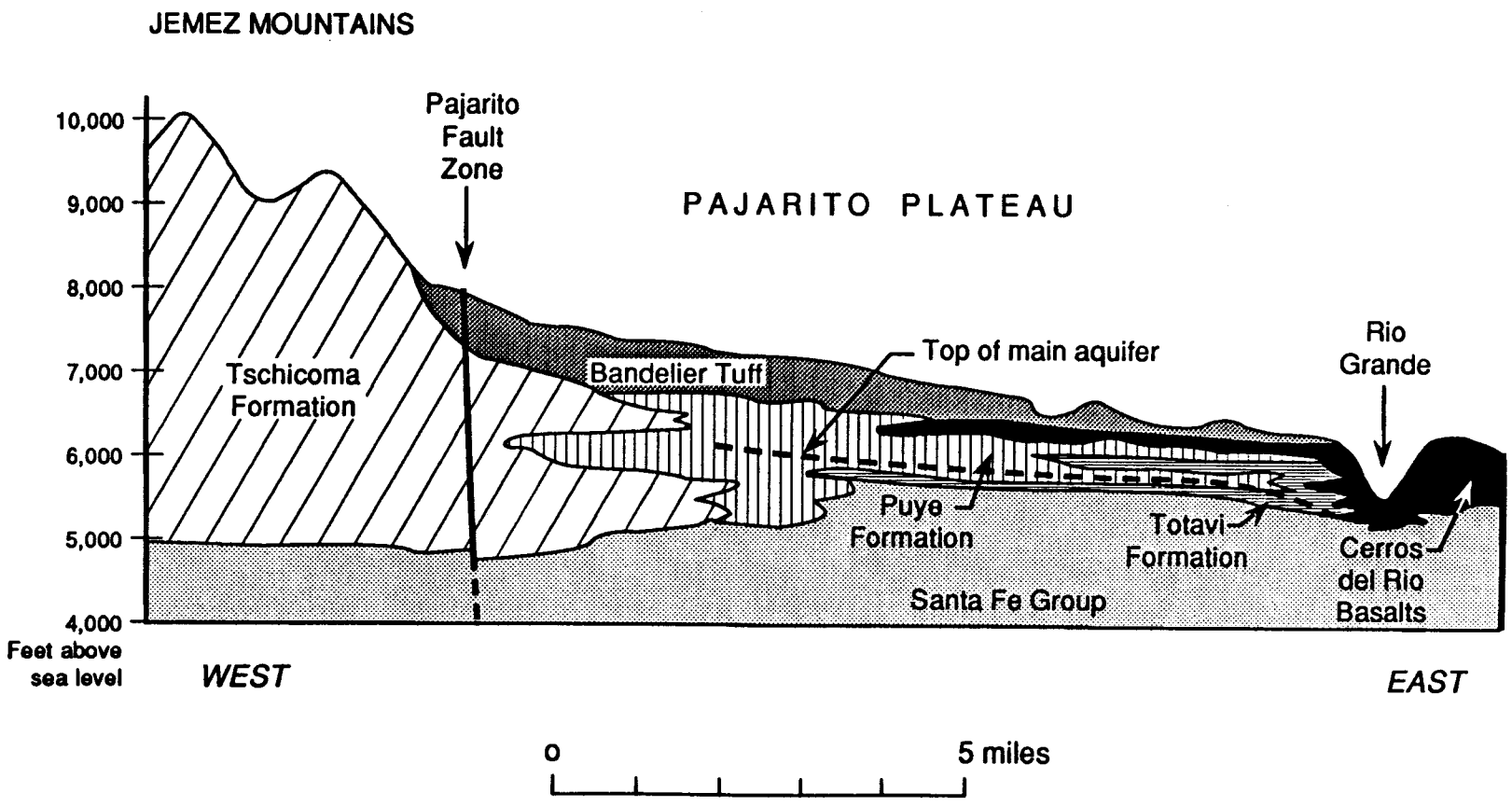
Figure 2-13
Index Map Showing Major Tectonic Elements of North-Central New Mexico



Reference: Griggs and Hem, 1964, "Geology and Ground-Water Resources of the Los Alamos Area, New Mexico," U.S. Geological Survey Water Supply Paper 1753, Albuquerque, New Mexico.

Figure 2-14
Physiographic Features of the Jemez Mountains

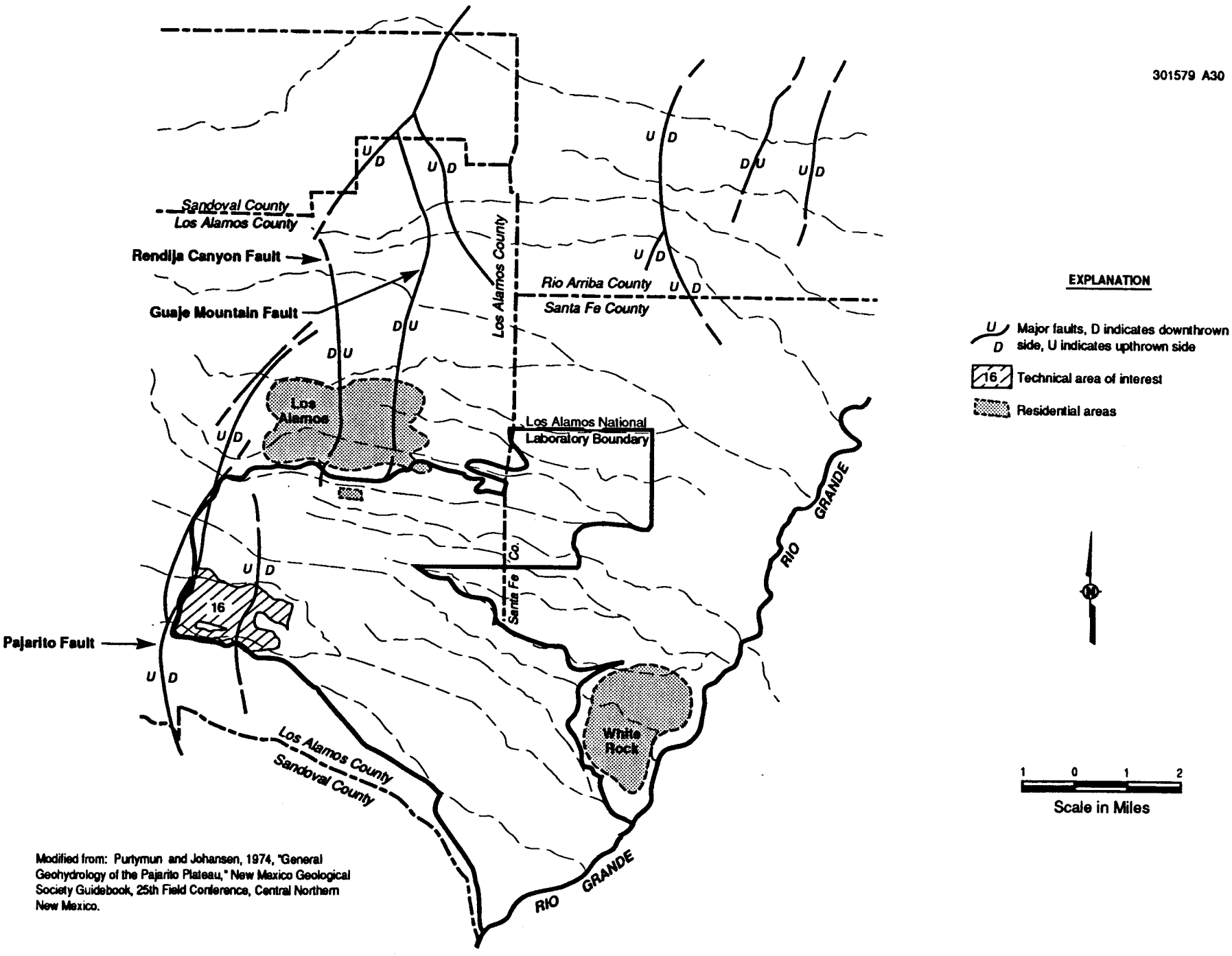
301579 A29



Reference: Los Alamos National Laboratory, 1993, "Installation Work Plan for Environmental Restoration," Rev. 3, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 2-15

East-West Geologic Section Showing Stratigraphy and Structure from the Sierra de Los Valles across the Pajarito Plateau to the Rio Grande



Modified from: Purtymun and Johansen, 1974, "General Geohydrology of the Pajarito Plateau," New Mexico Geological Society Guidebook, 25th Field Conference, Central Northern New Mexico.

Figure 2-16

Location Map of Los Alamos National Laboratory Facilities Relative to Nearby Active or Potentially Active Fault Traces

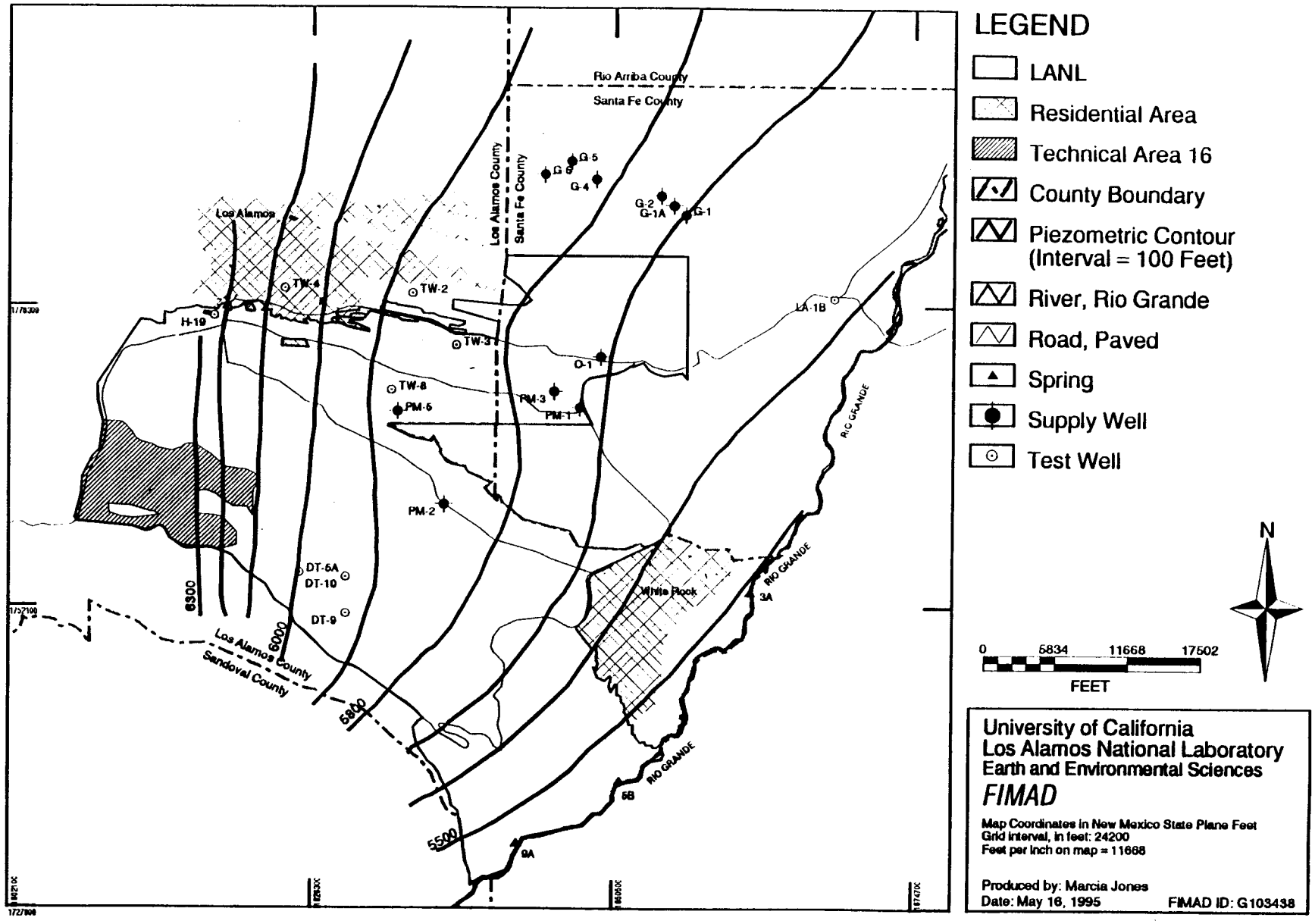


Figure 2-17
Generalized Piezometric Surface of Main Aquifer

3.0 WASTE ANALYSIS PLAN

Two waste analysis plans are included in this section. These waste analysis plans are individual plans for separate hazardous waste management units. The waste analysis plan for storage of Resource Conservation and Recovery Act (RCRA) hazardous and low-level solid mixed waste at the classified container storage area located at Technical Area (TA) 16, Building 88 (TA-16-88) is presented first. Page numbers for this plan are preceded by the alphanumeric code 3a (e.g., 3a-1, 3a-2, etc.). The waste analysis plan for thermal treatment of RCRA hazardous waste by open burning at TA-16 follows, and page numbers are preceded by the alphanumeric code 3b (e.g., 3b-1, 3b-2, etc.).

WASTE ANALYSIS PLAN FOR RCRA HAZARDOUS AND LOW-LEVEL SOLID MIXED WASTE STORED AT TECHNICAL AREA 16, BUILDING 88

LIST OF REGULATORY REFERENCES AND CORRESPONDING WASTE ANALYSIS PLAN LOCATION

RCRA[a] Regulatory Reference 20 NMAC 4.1[b], Subparts V, VIII, and IX	Description of Requirement	Location in the Waste Analysis Plan
264.13(a)(1)	Analysis information adequate to meet Parts 264 and 268 storage requirements	3a.2 and 3a.3
264.13(a)(2)	Waste analysis data	3a.3.2
264.13(a)(3)	Repeat analysis	3a.4
264.13(a)(4)	Inspection and analysis after each movement of hazardous waste received from off-site	Not applicable (NA)
264.13(b)	Written waste analysis plan	Entire plan
264.13(b)(1)	Parameters and rationale for selection	3a.2.1 and 3a.2.2 and Table 3a-2
264.13(b)(2)	Test methods	3a.2
264.13(b)(3)	Representative sample collection method	3a.3.3
264.13(b)(4)	Frequency for review or repeat of initial analysis	3a.4
264.13(b)(5)	Waste analysis information agreed upon for off-site facilities	3a.3.1, 3a.3.2, and Figure 3a-1
264.13(b)(6)	Additional waste analysis requirements	NA
264.13(b)(7)	Surface impoundments exempted under Part 268.4(a)	NA
264.13(c)	Inspection and analysis procedures for off-site facilities	NA
264.13(c)(1)	Procedures for identification of each movement of waste at off-site facilities	NA
264.13(c)(2)	Sampling method for the waste to be identified at off-site facilities	NA
264.13(c)(3)	For off-site landfills: procedures to determine whether a biodegradable sorbent has been added to containers	NA
268.7(a)	Determination of whether waste is restricted from land disposal	3a.6
268.7(b)	Testing requirements for treatment facilities	NA
268.7(b)(1)	Testing of treatment residues or extract of waste with concentration based treatment standards specified in Part 268.41	3a.6
268.7(b)(2)	Testing of treatment residues pursuant to Part 268.32	NA
268.7(b)(3)	Testing of treatment residues of waste with concentration based treatment standards specified in Part 268.43	3a.6
268.7(b)(4)	Notice requirements	3a.6 and Figure 3a-2

See footnotes at end of table.

LIST OF REGULATORY REFERENCES AND CORRESPONDING WASTE ANALYSIS PLAN LOCATION (Continued)

RCRA[a] Regulatory Reference 20 NMAC 4.1[b], Subparts V, VIII, and IX	Description of Requirement	Location in the Waste Analysis Plan
268.7(b)(5)	Certification of compliance with Part 268	3a.6
268.7(b)(6)	Notice and certification requirements for treatment facilities that ship treatment residues to a different treatment, storage, or disposal facility	NA
268.7(b)(7)	Notice requirement for recycling facilities using materials in a manner constituting disposal	NA
268.7(c)(1)	Record-keeping requirements for land disposal facilities	NA
268.7(c)(2)	Testing requirements for land disposal facilities	NA
268.7(d)(1)	Notification requirements for excluded debris (i.e., pursuant to Part 261.3)	NA
268.7(d)(2)	Updated notification requirements for debris	NA
268.7(d)(3)	Documentation and certification requirements for debris excluded under Part 261.3(e)(1)	NA
270.14(b)(2)	Chemical and physical analyses	3a.2

[a] Resource Conservation and Recovery Act
[b] New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), which adopts, with a few limited exceptions, Title 40 of the Code of Federal Regulations (40 CFR), Parts 260–266, Part 268, and Part 270 (1993). 20 NMAC 4.1, Subparts V, VIII, and IX, contain equivalent regulations to 40 CFR Parts 264, 268, and 270, respectively.

LIST OF DEFINITIONS

Acceptable knowledge - A term broadly defined to include process knowledge, waste analysis data, and/or facility records of analysis.

Existing (or currently generated) low-level mixed waste - Low-level mixed waste streams that have been characterized using Los Alamos National Laboratory (LANL)'s Waste Profile Form (WPF) (the WPF has been used since May 1991).

Future low-level mixed waste - Low-level mixed waste streams generated at LANL that will be characterized through the use of both LANL's WPF and a certification program.

Heterogeneous waste - Waste that is of dissimilar or diverse composition.

Homogeneous waste - Waste that is of uniform composition.

Low-level waste - Low-level waste defined in U.S. Department of Energy (DOE) Order 5820.2A (DOE, 1988) as "waste that contains radioactivity and is not classified as high-level waste, transuranic waste, spent nuclear fuel, or 11(e)(2) by-product material as defined by this Order. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level, provided that the concentration of transuranics is less than 100 nanocuries per gram of waste." By-product material, as defined in Section 11(e)(2) of the Atomic Energy Act of 1954, as amended, consists of uranium and thorium mill tailings. Section 11(e)(2) by-product material is not generated at LANL.

Low-level solid mixed waste - Solid waste that has both a Resource Conservation and Recovery Act (RCRA) hazardous waste component (see definition) and a low-level waste component (see definition).

Process knowledge - Described in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart V, 264.13(a)(2), as data developed under Subpart II, and existing published or documented data on a specific hazardous waste or on hazardous waste generated from similar processes.

RCRA hazardous waste - The criteria for establishing a waste as a RCRA hazardous waste are provided in 20 NMAC 4.1, Subpart II. A waste is considered hazardous if it meets the definition of a RCRA solid waste; is not exempted from regulation; and exhibits one or more of the characteristics described in 20 NMAC 4.1, Subpart II, Subpart C, or is listed in 20 NMAC 4.1, Subpart II, Subpart D.

RCRA solid waste - Any waste stream that meets the definition of a "solid waste" as specified in 20 NMAC 4.1, Subpart II, 261.2.

Solid waste - Any waste stream in a solid physical form. In this document, use of the term solid waste refers only to the solid physical form and has no additional regulatory meaning.

3a.0 WASTE ANALYSIS PLAN FOR RCRA HAZARDOUS AND LOW-LEVEL SOLID MIXED WASTE STORED AT TECHNICAL AREA 16, BUILDING 88

This waste analysis plan (WAP) presents information on the chemical and physical nature of Resource Conservation and Recovery Act (RCRA) hazardous and low-level solid mixed waste and general RCRA hazardous and low-level solid mixed waste characterization methods used at Los Alamos National Laboratory (LANL). The waste analysis information contained within this WAP is specific to storage requirements for the classified container storage area located at Technical Area (TA) 16, Building 88 (TA-16-88). Waste analysis requirements are specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart IX, 270.14(b)(2); in 20 NMAC 4.1, Subpart V, 264.13, "General Waste Analysis"; and in 20 NMAC 4.1, Subpart VIII, 268.7, "Waste Analysis and Recordkeeping." The content of this WAP generally follows the guidance provided in "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual" (U.S. Environmental Protection Agency [EPA], 1994b); and "RCRA Part B Permit Writers' Guidance Manual for Department of Defense Open Burning/Open Detonation Units" (U.S. Army Environmental Hygiene Agency [AEHA], 1987). The latter is referenced specifically regarding the management of waste relative to human health and the environment.

Mixed waste contains both a hazardous waste component, as defined and regulated by RCRA, and a radioactive waste component. This WAP addresses only storage of RCRA hazardous and low-level solid mixed waste. *RCRA hazardous waste* and *low-level solid mixed waste* are defined on pages 3a-iv and 3a-v of this WAP.

For waste characterization purposes, low-level solid mixed waste at TA-16-88 has been divided into two groups based on the timeframe for generation of the waste: *existing (or currently generated)* and *future*. These two groups are defined in the List of Definitions.

This WAP is organized as follows. Section 3a.1 includes a facility description, information on RCRA hazardous and low-level solid mixed waste-generating processes and activities, identification of RCRA hazardous and low-level solid mixed waste managed, and the associated hazardous and low-level solid mixed waste container storage area. Section 3a.2 presents waste parameters, including the criteria and rationale for selection. Section 3a.3 provides waste characterization procedures. Section 3a.4 provides verification requirements. Section 3a.5 addresses special procedural requirements (e.g., for ignitable, reactive, and incompatible

waste). Section 3a.6 provides procedures to ensure compliance with land disposal restrictions (LDR) requirements.

3a.1 FACILITY DESCRIPTION

LANL is located in Los Alamos County in north-central New Mexico. It is approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. LANL, which is divided into 49 TAs, and the associated residential and commercial areas of Los Alamos County are situated on the Pajarito Plateau. The principal mission of LANL includes the research, design, development, and analysis of weapons components for the nation's nuclear arsenal; supporting research programs; energy research and environmental missions; and environmental management programs. LANL is owned by the U.S. Department of Energy (DOE) and is operated jointly by DOE and the University of California.

3a.1.1 Facility Waste-Generating Processes, Activities, and Identification of RCRA Hazardous and Low-Level Solid Mixed Wastes Managed

RCRA hazardous and low-level solid mixed waste is generated at LANL primarily from research and development activities. Table 3a-1 summarizes information available on the RCRA hazardous and low-level solid mixed waste that may be stored at TA-16-88, including the characterization basis for hazardous waste designation (i.e., process knowledge and/or analysis); potential EPA Hazardous Waste Number(s); potential hazardous constituents in and/or characteristics of the waste; and regulatory limits. A description of the RCRA hazardous and low-level solid mixed waste managed at TA-16-88 is provided below.

3a.1.1.1 Heterogeneous RCRA Hazardous and Low-Level Solid Mixed Wastes

The waste streams that may be stored at the TA-16-88 container storage area can be described as *heterogeneous* (i.e., dissimilar or diverse composition). This heterogeneous RCRA hazardous and low-level solid mixed waste stream may include the following EPA Hazardous Waste Numbers: D001 (ignitable), D003 (reactive), D005 (toxicity characteristic for barium), D008 (toxicity characteristic for lead), and D009 (toxicity characteristic for mercury). A specific waste description and waste-generating process cannot be provided due to the classified nature of the waste-generating area.

3a.1.2 Description of the RCRA Hazardous and Low-Level Solid Mixed Waste Storage Unit

The RCRA hazardous and low-level solid mixed waste storage unit at TA-16-88 is currently operating under interim status. The design features of and operations at this unit are fully described in other sections of this permit application.

3a.2 WASTE PARAMETERS [20 NMAC 4.1, Subpart V, 264.13(a)(1)]

A detailed chemical and physical characterization will be performed based solely on process knowledge prior to RCRA hazardous and low-level solid mixed waste storage, as required by RCRA. Parameter selection and waste characterization of reactive RCRA hazardous and low-level solid mixed waste is based solely on process knowledge due to the potential safety problems associated with management of this material, the lack of laboratory capability for chemical analysis, and the fact that the EPA manual titled "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) (EPA, 1992a) has no applicable required methodology for characterization of reactive RCRA hazardous and low-level solid mixed waste. Process knowledge provides a complete and adequate characterization for the safe and compliant storage of reactive waste. Waste parameters will be selected to ensure that this characterization will contain all information necessary to properly store RCRA hazardous and low-level solid mixed waste in accordance with RCRA general facility standards and LDR requirements. Characterization will be performed by utilizing the procedures described in Section 3a.3.

3a.2.1 Proposed Analytical Parameters and Methods [20 NMAC 4.1, Subpart V, 264.13(b)(1), and Subpart IX, 270.14(b)(2)]

Proposed analytical parameters, characterization methods, and the rationale for selecting these analytical parameters for RCRA hazardous and low-level solid mixed waste that may be stored at TA-16-88 are summarized in Table 3a-2. The parameters listed in Table 3a-2 were selected based on acceptable knowledge, as described in Section 3a.3.2, for the heterogeneous waste form described in Section 3a.1.1.1.

3a.2.2 Criteria and Rationale for Parameter Selection [20 NMAC 4.1, Subpart V, 264.13(b)(1)]

Waste analysis parameters were selected to characterize RCRA hazardous and low-level solid mixed waste in conformance with RCRA. These parameters are based on knowledge of raw materials and physical/chemical processes of waste-generating activities, and may be supported by analytical results. The rationale for the selected parameters are identified in Table 3a-2.

3a.3 CHARACTERIZATION OF REACTIVE RCRA HAZARDOUS AND LOW-LEVEL SOLID MIXED WASTE [20 NMAC 4.1, Subpart V, 264.13(a)(1) and 264.13(b)(2), and Subpart IX, 270.14(b)(2)]

Reactive RCRA hazardous and low-level solid mixed waste is sufficiently characterized by process knowledge, which is provided by individual waste generators on LANL's Waste Profile Form (WPF). Adequately documented process knowledge fully conforms with RCRA, is

adequate to safely store reactive waste, and is the only alternative available for characterization of reactive RCRA hazardous and low-level solid mixed waste. Therefore, reactive RCRA hazardous and low-level solid mixed waste is not analyzed at LANL. Further, only limited types of reactive constituents are utilized at LANL by the Engineering Sciences and Applications (ESA) Division, Engineering Analysis (EA) Group, and the composition of reactive constituents of the materials used during research and development activities is well documented. There are also safety considerations that preclude routine analysis of reactive RCRA hazardous and low-level solid mixed waste.

Due to the safety considerations associated with the management of reactive RCRA hazardous and low-level solid mixed waste, reevaluation will only occur under the following conditions:

- Use of different raw materials (different formulation) in mock explosives
- Visual inspections of the waste indicates a change in the waste characteristics.

Future low-level solid mixed waste will be characterized by utilizing the WPF and a certification program to be implemented. In addition, for waste streams characterized by process knowledge, LANL will implement a documented quality assurance (QA)/quality control (QC) program that will address management of these specific waste streams. For example, the QA/QC program may include procedures for controlling chemical inputs to the waste-generating process as well as procedures for confirming the types of waste placed in different waste containers. These measures will provide knowledge of the types and concentrations of chemical constituents in individual waste streams.

If plans are made to store a reactive RCRA hazardous or low-level solid mixed waste that has not previously been stored, LANL will collect enough information to effectively characterize this waste stream prior to storage.

3a.3.1 Waste Profiling System [20 NMAC 4.1, Subpart V, 264.13(a)(3), 264.13(b)(4) and (5), and Subpart IX, 270.14(b)(2)]

In an effort to maintain detailed and accurate waste characterization information, LANL's Hazardous and Solid Waste Group (ESH-19) and the Chemical Science and Technology (CST) Division utilize a generator waste-profiling program. Reactive RCRA hazardous and low-level solid mixed waste is characterized using process knowledge, which is provided by individual waste generators on LANL's WPF. The WPF is described in detail below and in LANL's Administrative Requirement 10-9, "Waste Profile Form." The waste-profiling effort requires each

waste generator to provide a detailed written description of the waste on a standardized WPF, Form 1346 (Figure 3a-1). The waste description can be based on generator process knowledge, the use of appropriate Material Safety Data Sheets (MSDS), and/or results of a chemical/physical analysis of the specific waste. By completing the WPF, waste generators supply information that allows for proper management of reactive RCRA hazardous and low-level solid mixed waste. The WPF also allows the generator to request analysis for unknown or incompletely characterized waste streams. Specific waste information requested on the WPF includes:

- Point of generation
- Method of characterization
- Waste categories
- Waste description
- Waste origination
- Classification of radioactivity
- Presence of toxic metals and an estimate of concentration
- Presence of organic compounds and an estimate of concentration
- Identification of hazardous constituents
- Identification of hazardous characteristics.

A correctly completed WPF contains enough data to allow ESH-19 to classify the waste as either non-RCRA-regulated waste, RCRA-regulated solid waste (i.e., regulated under RCRA Subtitle D), RCRA-regulated hazardous (includes mixed) waste (i.e., regulated under RCRA Subtitle C), or radioactive waste. These four waste classifications are each divided into categories that further distinguish specific wastes. For example, RCRA-regulated hazardous waste is categorized as ignitable, reactive, corrosive or toxicity characteristic, and any additional chemical constituents must be listed. For radioactive waste, activation products, fission products, transuranic radionuclides contamination type, and other general information serves to distinguish specific wastes. These categories are identified on the WPF. By associating a waste with an individual category, ESH-19 can accurately classify the waste and assign it the appropriate EPA Hazardous Waste Number(s). The accuracy of information provided on the WPF as well as the resulting waste classification is reviewed by ESH-19 and CST. Ultimately, the waste profile is used by CST to determine the proper procedures for management of the waste.

All waste generators must certify, based on their knowledge of the waste, that the information on the WPF is complete and accurate. Knowingly providing false information can result in administrative action by LANL.

The WPF must be completed prior to any waste treatment, storage, or disposal. Waste generators must provide new profiles when a process change results in a change in waste composition or when a new waste is generated; otherwise, WPFs are reevaluated annually.

3a.3.2 Acceptable Knowledge [20 NMAC 4.1, Subpart V, 264.13(a)(2), and 264.13(b)(5), and Subpart IX, 270.14(b)(2)]

The physical and chemical nature of reactive RCRA hazardous and low-level solid mixed waste forms (e.g., debris, equipment, and instruments) makes the collection of representative samples impractical, difficult, and dangerous. The chemical composition of any waste stream stored at TA-16-88 is well known and documented. Further, due to a lack of analytical laboratories capable of accepting and analyzing reactive RCRA hazardous and low-level solid mixed waste and due to the potential dangers to human health and the environment by unnecessary handling of reactive waste, process knowledge alone is adequate to characterize any waste stream stored at TA-16-88. Additional difficulty arises when sampling heterogeneous waste. Some factors associated with this difficulty include:

- waste streams which contain disparate elements;
- large objects cannot be made to fill standard size sample containers;
- disparate elements may need to be segregated into similar forms; and
- laboratories may not have the capability to sample large objects (EPA, 1992b)

According to EPA guidance, *acceptable knowledge* is broadly defined to include process knowledge, waste analysis data, and/or facility records of analysis (EPA, 1994b). *Process knowledge* is described in 20 NMAC 4.1, Subpart V, Section 264.13(a)(2), as data developed under Subpart II, and existing published or documented data on a specific hazardous waste or on hazardous waste generated from similar processes. *Waste analysis data* include concentration(s) of RCRA-regulated constituents and/or results of tests for hazardous characteristics. These data are used to determine whether wastes are RCRA-regulated and to determine LDR status. Facility records of analysis performed before the effective date of RCRA regulations will be used with caution. These analytical results must be accurate and applicable to the specified waste and should be supplemented with other existing information (e.g.,

published data). Examples presented in the EPA guidance as to when application of acceptable knowledge may be appropriate include:

- Wastes containing hazardous constituents from specific processes that are well documented, such as F-listed and/or K-listed waste code descriptions.
- Wastes consisting of discarded unused commercial chemical products, reagents, or chemicals of known physical and chemical constituents. Several of these fall into the P-listed and U-listed categories.
- Waste (e.g., radioactive mixed waste) for which health and safety risks to personnel do not justify sampling and analysis due to quantified and documented radiological concerns.
- Wastes containing heterogeneous materials, where the physical nature of the waste does not lend itself to taking a representative sample (e.g., laboratory trash and construction debris with surface contamination) (EPA, 1994b).

At LANL, waste generators will obtain, assemble, and prepare the acceptable knowledge documentation available for each waste stream in a separate auditable file or maintain a waste stream reference file that identifies the acceptable knowledge documents and their locations. The acceptable knowledge documentation must be explicitly relevant and traceable to a waste type and must not be merely a list of information sources for a particular operation and waste. There are many sources of applicable documentation at LANL that may be used to substantiate acceptable knowledge for a specific waste stream. Examples of documentation that may be used include the following:

- Preliminary and final safety analysis reports, unreviewed safety question determinations, and technical safety requirements.
- Standard operating procedures (SOP) and detailed operating procedures, which can include lists of raw materials or reagents, describe the process/experiment which uses the materials, and describe the wastes generated and how the wastes are handled.
- Test plans or research project reports that describe the reagents and other raw materials used in an experiment.
- Site databases (e.g., chemical inventory database for Superfund Amendments and Reauthorization Act Title III requirements).
- Information from site personnel (e.g., documented interviews).

- Standard industry practice documents (e.g., vendor information).
- Previous analytical data relevant to the waste stream.
- MSDSs, product labels, and other product package information.
- Documented visual inspections to confirm or identify the physical characteristics of a waste.
- Laboratory notebooks that detail the research processes and raw materials used in an experiment.

3a.3.3 Sampling and Analysis for Reactive RCRA Hazardous and Low-Level Mixed Waste [20 NMAC 4.1, Subpart V, 264.13(a)(3), 264.13(b)(2), (3), and (4), and Subpart IX, 270.14(b)(2)]

The inherent nature of reactive waste makes sampling and analysis dangerous. Due to the possible risk to human health and the environment from unnecessary handling of reactive RCRA hazardous and low-level solid mixed waste, LANL will rely on process knowledge to characterize these wastes. Therefore, sampling and analysis of reactive waste is not necessary at LANL because adequate and complete characterization will be achieved with process knowledge.

Future low-level solid mixed waste will be characterized by utilizing the WPF and a certification program to be implemented. In addition, LANL will implement a documented QA/QC program that will address management of waste streams characterized by process knowledge. For example, the QA/QC program may audit waste characterization documentation and/or the waste generators, or the program may include procedures for controlling chemical inputs to the waste-generating process.

If plans are made to store a reactive RCRA hazardous and low-level solid mixed waste that has not previously been stored, LANL will collect enough information to effectively characterize this waste stream prior to storage.

3a.4 VERIFICATION ANALYSIS FOR RCRA HAZARDOUS AND LOW-LEVEL SOLID MIXED WASTE [20 NMAC 4.1, Subpart V, 264.13(a)(3)]

Characterization for RCRA hazardous and low-level solid mixed waste will not require verification because the initial characterization provides sufficient information to determine whether a waste is hazardous, as defined in RCRA.

3a.5 PROCEDURES FOR IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTES [20 NMAC 4.1, Subpart V, 264.17]

LANL personnel will take all precautions necessary to prevent accidental ignition or reaction of ignitable and/or reactive waste managed at TA-16-88. All wastes that may be stored at TA-16-88 are either ignitable, reactive, or both. No incompatible wastes will be stored at the container storage area; therefore, LANL will rely on SOPs for specific safety and handling procedures associated with the storage of reactive waste.

3a.6 PROCEDURES TO ENSURE COMPLIANCE WITH LDR REQUIREMENTS [20 NMAC 4.1, Subpart VIII, 268.7(a) and 268.7(b)(3), (4), and (5)]

In accordance with the LDR regulations, treatment standards are expressed in two ways: (1) as constituent concentrations in the waste (from either an extract of the waste, as determined by the toxicity characteristic leaching procedure, or from the total volume of the waste, referred to as total waste analysis) or (2) as specified treatment technologies. Reactive waste has a specified treatment technology of deactivation; therefore, verification through analysis is not necessary. LANL will document in its operating record that the appropriate treatment technology has been employed prior to land disposal of treatment residues. Waste that must meet concentration-based treatment standards prior to shipment off-site for disposal will be evaluated to determine if applicable constituent concentration levels have been attained. This will be accomplished by testing the waste, or by using acceptable knowledge (EPA, 1994b). Testing will be conducted only to certify that a waste meets LDR treatment standards. If a waste meets applicable LDR treatment standards based on acceptable knowledge, then testing to certify LDR compliance is not necessary. All analytical results completed in support of LDR requirements will be retained within the facility operating record.

Wastes resulting from facility operations that exceed applicable LDR treatment standards will be sent to a permitted treatment facility if treatment options are available for low-level solid mixed waste. For off-site shipments of these wastes, LDR notifications, with information required under 20 NMAC 4.1, Subpart VIII, Part 268.7, will be supplied. In addition to the LDR notification, additional data for the waste stream (e.g., WPF, analytical data) may be provided to the designated treatment facility.

Any wastes that are determined through analysis to meet treatment standards as specified in 20 NMAC 4.1, Subpart VIII, Part 268, Subpart D, will be land disposed in a permitted facility without further treatment. An LDR notification form (Figure 3a-2), including all analytical records

to support the notification, will be prepared and will accompany the shipment of waste to the receiving facility.

Los Alamos
National Laboratory

WASTE PROFILE FORM

Account Information

For rapid processing, complete **all sections** in black or blue ink and mail this form to Waste Services Group at MS J579

Reference Number

Waste Generator's Name (Print)	Znumber	Waste Management Coordinator's Name (Print)	Znumber

Generator's Group	Generator's Telephone	Generator's Mail Stop	Waste Stream Technical Area	Building	Room

Waste Accumulation
Check as many as apply.

- ☐ Satellite accumulation area --> site no.: _____
- ☐ Less than 90 day accumulation area --> site no.: _____
- ☐ Radioactive Materials Management Area (RMMA) --> site no.: _____
- ☐ None of the above

Method of Characterization
Check as many as apply.

- ☐ Acceptable Knowledge (AK)
- ☐ Analysis attached --> sample/request no. _____
- ☐ MSDS attached
- ☐ Request for analysis

Section 1- Chemical and Physical Characteristics

For help in completing this section of the form, call 5-WAST or 5-4000.

Waste Type
Check only one.

- ☐ Unused/unspent chemical
  Check *Waste Classes* and *Associated Documentation* Only
- ☐ Process waste/spent chemical
  Complete all of Section 1.

Waste Classes
Check as many as apply.

- ☐ On-going generation
- ☐ One-time generation
- ☐ Radioactive (complete Sec. 2)
- ☐ Non-radioactive
- ☐ Wastewater (complete Sec. 3)
- ☐ Classified/Sensitive

Associated Documentation
Check as many as apply.

- ☐ Process SOP --> no.: _____
- ☐ RMMA OP --> no.: _____
- ☐ WM SOP --> no.: _____
- ☐ Other --> _____
- ☐ None --> describe below

Waste Category
Check as many as apply.

- ☐ Solvent
- ☐ Degreaser
- ☐ Dioxin
- ☐ Electroplating
- ☐ Treated hazardous waste residue
- ☐ Explosive process waste
- ☐ Infectious/biological waste
- ☐ Beryllium
- ☐ Asbestos-friable
- ☐ Asbestos-nonfriable
- ☐ Empty containers
- ☐ PCB (<50 ppm)
  - ☐ PCB (50 - 500 ppm)
  - ☐ PCB (> 500 ppm)
  - → id. no. : _____
- ☐ Not applicable --> describe below

Waste Sources
Check as many as apply.

- ☐ Research and development
- ☐ Maintenance
- ☐ Construction
- ☐ Material processing
- ☐ Decon/decom
- ☐ Investigation denved
- ☐ Remediation
- ☐ UST - petroleum
- ☐ UST - non-petroleum
- ☐ Generator treatment
- ☐ Interim/permitted treatment
- ☐ Industrial sludge
- ☐ Sanitary sludge
- ☐ Abatement

Waste Matrix
Check only one.

Gas

- ☐ ≤ 1.5 Atmospheres
- ☐ > 1.5 Atmospheres

Liquid

- ☐ Aqueous
- ☐ Organic
- ☐ Inorganic

Solid

- ☐ Powder/ash
- ☐ Solid
- ☐ Absorbed liquid

Matrix Type
Check only one.

- ☐ Homogeneous
- ☐ Heterogeneous --> describe below

Waste/Process Description

_____
_____
_____
_____
_____
_____
_____

Figure 3a-1
Waste Profile Form

Section 1- Chemical and Physical Characteristics (continued)

Ignitability (degrees F.)
Check only one.

- ☐ < 73
- ☐ 73-99
- ☐ 100-139
- ☐ 140-200
- ☐ > 200
- ☐ Ignitable solid
- ☐ DOT oxidizer
- ☐ Not ignitable

Corrosivity (pH)
Check only one.

- ☐ ≤ 2.0
- ☐ 2.1-4.0
- ☐ 4.1-6.0
- ☐ 6.1-9.0
- ☐ 9.1-12.4
- ☐ ≥ 12.5
- ☐ Liquid corrosive to steel
- ☐ Not aqueous

Reactivity
Check as many as apply.

- ☐ Unstable
- ☐ Water reactive
- ☐ Pyrophoric
- ☐ Cyanide bearing
- ☐ Sulfide bearing
- ☐ Shock sensitive
- ☐ Explosive - class _____
- ☐ Non-reactive

Boiling Point (degrees F.)
Check only one.

- ☐ ≤ 95
- ☐ > 95
- ☐ Not applicable

Identify presence of contaminants.			Minimum	Maximum	Unit (ppm or % only)	Analytical method
Toxicity Characteristic Metals						
Arsenic	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Barium	☐ None	☐ < 100.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Cadmium	☐ None	☐ < 1.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Chromium	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Lead	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Mercury	☐ None	☐ < 0.2 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Selenium	☐ None	☐ < 1.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Silver	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Toxicity Characteristic Organic Compounds						
Benzene	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Carbon tetrachloride	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Chlorobenzene	☐ None	☐ < 100.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Chloroform	☐ None	☐ < 6.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Cresol	☐ None	☐ < 200.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
1,4-dichlorobenzene	☐ None	☐ < 7.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
1,2-Dichloroethane	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
1,1-Dichloroethylene	☐ None	☐ < 0.7 ppm	_____	to _____	_____	☐ TCLP ☐ Total
2,4-Dinitrotoluene	☐ None	☐ < 0.13 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Hexachlorobenzene	☐ None	☐ < 0.13 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Hexachlorobutadiene	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Hexachloroethane	☐ None	☐ < 3.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Methyl ethyl ketone	☐ None	☐ < 200.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Nitrobenzene	☐ None	☐ < 2.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Pentachlorophenol	☐ None	☐ < 100.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Pyridine	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Perchloroethylene or tetrachloroethylene	☐ None	☐ < 0.7 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Trichloroethylene	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
2,4,5-Trichlorophenol	☐ None	☐ < 400.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
2,4,6-Trichlorophenol	☐ None	☐ < 2.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Vinyl chloride	☐ None	☐ < 0.2 ppm	_____	to _____	_____	☐ TCLP ☐ Total

Additional Chemical Constituents and Contaminants (for hazardous constituents, see AR 10-3, Appendix A)
List all other constituents (including inerts) not identified above and attach any applicable analyses.

Name of constituent	Cas no.(optional)	Minimum	Maximum	Unit (ppm or % only)
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____

Figure 3a-1 (Continued)
Waste Profile Form

Section 2- Radiological Characteristics

For help in completing this section of the form, call 5-WAST or 5-4000.

	Range minimum		Range maximum	Unit (Ci/g or Ci/l)
General				
☐ Alpha	_____	to	_____	_____
☐ Beta	_____	to	_____	_____
☐ Gamma	_____	to	_____	_____
TRU radionuclides				
☐ None present				
☐ Am-241	_____	to	_____	_____
☐ Am-243	_____	to	_____	_____
☐ Cf-249	_____	to	_____	_____
☐ Cf-251	_____	to	_____	_____
☐ Cm-243	_____	to	_____	_____
☐ Cm-245	_____	to	_____	_____
☐ Cm-247	_____	to	_____	_____
☐ Pu-238	_____	to	_____	_____
☐ Pu-239	_____	to	_____	_____
☐ Pu-240	_____	to	_____	_____
☐ Pu-242	_____	to	_____	_____
Fission products				
☐ None present				
☐ Ba-140	_____	to	_____	_____
☐ Ce-144	_____	to	_____	_____
☐ Cs-134	_____	to	_____	_____
☐ Cs-137	_____	to	_____	_____
☐ I-129	_____	to	_____	_____
☐ I-133	_____	to	_____	_____
☐ Kr-85	_____	to	_____	_____
☐ Nb-95	_____	to	_____	_____
☐ Ru-106	_____	to	_____	_____
☐ Sb-125	_____	to	_____	_____
☐ Sr-90	_____	to	_____	_____
☐ Tc-99	_____	to	_____	_____
☐ Zr-93	_____	to	_____	_____
☐ Zr-95	_____	to	_____	_____
Activation products				
☐ None present				
☐ As -74	_____	to	_____	_____
☐ Be-7	_____	to	_____	_____
☐ C-14	_____	to	_____	_____
☐ Co-56	_____	to	_____	_____
☐ Co-57	_____	to	_____	_____
☐ Co-58	_____	to	_____	_____
☐ Co-60	_____	to	_____	_____
☐ Cr-51	_____	to	_____	_____
☐ Eu-152	_____	to	_____	_____
☐ Mn-52	_____	to	_____	_____
☐ Mn-54	_____	to	_____	_____
☐ Nb-94	_____	to	_____	_____
☐ Ni-59	_____	to	_____	_____
☐ Ni-63	_____	to	_____	_____
☐ Rb-83	_____	to	_____	_____
☐ Rb-84	_____	to	_____	_____
☐ Se-75	_____	to	_____	_____
☐ Sr-82	_____	to	_____	_____
☐ Sr-85	_____	to	_____	_____
☐ V-48	_____	to	_____	_____
☐ Y-88	_____	to	_____	_____
☐ Zn-65	_____	to	_____	_____
☐ Zr-88	_____	to	_____	_____

	Range minimum		Range maximum	Unit (Ci/g or Ci/l)
Other				
☐ None present				
☐ Am-242	_____	to	_____	_____
☐ Bi-207	_____	to	_____	_____
☐ Bi-210	_____	to	_____	_____
☐ Cf-250	_____	to	_____	_____
☐ Cf-252	_____	to	_____	_____
☐ Cm-244	_____	to	_____	_____
☐ H-3	_____	to	_____	_____
☐ Pa-231	_____	to	_____	_____
☐ Pb-210	_____	to	_____	_____
☐ Po-210	_____	to	_____	_____
☐ Pu-236	_____	to	_____	_____
☐ Pu-241	_____	to	_____	_____
☐ Ra-226	_____	to	_____	_____
☐ Ra-228	_____	to	_____	_____
☐ Th-230	_____	to	_____	_____
☐ Th-232	_____	to	_____	_____
☐ U-232	_____	to	_____	_____
☐ U-233	_____	to	_____	_____
☐ U-234	_____	to	_____	_____
☐ U-235	_____	to	_____	_____
☐ U-236	_____	to	_____	_____
☐ U-238	_____	to	_____	_____
Add'l radionuclides				
☐ No additional radionuclides present				
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____

Contamination Type: *Check as many as apply.*

☐ Volume Contamination

☐ Surface Contamination

Figure 3a-1 (Continued)
Waste Profile Form

Section 3 - Wastewater Characteristics

For help in completing this section of the form, call 7-4301.

Identify presence of contaminants			Minimum	Maximum	Unit (ppm or % only)	Analytical method
Aluminum	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Boron	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Cobalt	☐ None	☐ < 1.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Copper	☐ None	☐ < 1.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Vanadium	☐ None	☐ < 0.10 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Zinc	☐ None	☐ < 95.4 ppm	_____	to _____	_____	☐ TCLP ☐ Total

Maximum daily flow when discharge occurs: _____ ☐ Gallons ☐ Liters

Average daily flow when discharge occurs: _____ ☐ Gallons ☐ Liters

Estimated number of days per year that discharge will occur: _____

Estimated total volume per year discharged to the Radioactive Liquid Waste Collection System at TA-50-1: _____ ☐ Gallons ☐ Liters

For TA-55 use only. Wastewater will be discharged through one of the following:

☐ Acid line ☐ Caustic line ☐ Industrial waste line

Section 4 - Additional Information

If additional information is available on the chemical, physical, or radiological character of the waste not covered on this form, provide it below:

WASTE GENERATOR CERTIFICATION: *Based on my knowledge of the waste and/or chemical/physical analysis, I certify that the information on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.*

Signature	Date

Figure 3a-1 (Continued)
Waste Profile Form

Los Alamos
National Laboratory

LAND DISPOSAL RESTRICTIONS NOTIFICATION FORM

A copy of this form must be attached to each Waste Profile Form and to each Uniform Hazardous Waste Manifest required to transport waste within LANL, pursuant to 40 CFR 268.7(a)(1).

Waste Profile Form No.	Chemical Waste/ Waste Disposal Record No.	Uniform Hazardous Waste Manifest No.	Date of Waste Pickup

Check only one.

- ☐ Non-wastewater
- ☐ Wastewater [as defined in 40 CFR 268.2(f)]

NOTIFICATION OF CALIFORNIA LIST APPLICABILITY

Check all that apply.

- ☐ Liquid hazardous waste containing PCBs at a concentration of 50 ppm.
- ☐ A D001 D017 liquid waste containing 134 mg/L of nickel and/or 130 mg/L of thallium.
- ☐ A D001 D011 waste containing Halogenated Organic Compounds (HOCs) listed in 40 CFR 268, Appendix III, at 1000 ppm.

NOTIFICATION OF "D" CHARACTERISTIC EPA WASTE CODES

Check all that apply.

EPA Waste Code	Waste Description and/or Subcategory (as needed)
☐ D001*	Ignitable characteristic wastes [except for the Section 261.21(a)(1) High TOC Subcategory] that are managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems.
☐ D001*	High TOC Ignitable Characteristic Liquids Subcategory based on 40 CFR 261.21(a)(1) - Greater than 10% total organic carbon.
☐ D002*	Corrosive Characteristic Wastes that are managed in non-CWA/non-CWA-equivalent/non-Class I SDWA systems.
☐ D003	Reactive Sulfides Subcategory
☐ D003	Reactive Cyanides Subcategory
☐ D003	Water Reactive Subcategory
☐ D003	Other Reactives Subcategory [based on 261.23(a)(1)]
☐ D004	
☐ D005	
☐ D006	Wastes that exhibit the TC for cadmium
☐ D006	Cadmium Containing Batteries Subcategory
☐ D007	
☐ D008	Wastes that exhibit TC for lead
☐ D008	Lead Acid Batteries Subcategory
☐ D008	Radioactive Lead Solids Subcategory
☐ D009	High Mercury-Organic Subcategory (260 mg/kg Hg with organics and not incinerator residues)
☐ D009	High Mercury-Inorganic Subcategory (260 mg/kg Hg [with inorganics])
☐ D009	Low Mercury Subcategory (<260 mg/kg Hg)
☐ D009	All D009 wastewaters
☐ D009	Elemental mercury contaminated with radioactive materials.
☐ D009	Hydraulic oil contaminated with Mercury Radioactive Materials Subcategory
☐ D010	
☐ D011	

☐ D012*	☐ D020*	☐ D028*	☐ D036*
☐ D013*	☐ D021*	☐ D029*	☐ D037*
☐ D014*	☐ D022*	☐ D030*	☐ D038*
☐ D015*	☐ D023*	☐ D031*	☐ D039*
☐ D016*	☐ D024*	☐ D032*	☐ D040*
☐ D017*	☐ D025*	☐ D033*	☐ D041*
☐ D018*	☐ D026*	☐ D034*	☐ D042*
☐ D019	☐ D027	☐ D035	☐ D043

*All applicable Underlying Hazardous Constituents in these characteristic wastes must be checked in Table UTS.

Figure 3a-2
Land Disposal Restrictions Notification Form

Los Alamos
National Laboratory

LAND DISPOSAL RESTRICTIONS NOTIFICATION FORM

NOTIFICATION FOR F001 F005 SPENT SOLVENT WASTES

Check all that apply.

Spent solvent wastes with the following constituents only.

EPA Waste Code	Constituents in the waste	
☐ F001	☐ Acetone	☐ Isobutyl alcohol
☐ F002	☐ Benzene	☐ Methanol
☐ F003	☐ n-Butyl alcohol	☐ Methylene chloride
☐ F004	☐ Carbon disulfide (wastewater only)	☐ Methyl ethyl ketone
☐ F005	☐ Carbon tetrachloride	☐ Methyl isobutyl ketone
	☐ Chlorobenzene	☐ Nitrobenzene
	☐ o-cresol	☐ Pyridine
	☐ m-cresol	☐ Tetrachloroethylene
	☐ p-cresol	☐ Toluene
	☐ Cresol-mixed isomers (Cresylic acid)	☐ 1,1,1-Trichloroethane
	☐ Cyclohexanone (wastewater only)	☐ 1,1,2-Trichloroethane
	☐ o-Dichlorobenzene	☐ 1,1,2-Trichloro - 1,2,2-trifluoroethane
	☐ Ethyl acetate	☐ Trichloroethylene
	☐ Ethyl benzene	☐ Trichloromonofluoromethane
	☐ Ethyl ether	☐ Xylenes mixed isomers (o-, m-, p-xylene)

Check all that apply.

EPA Waste Codes	Constituents in the waste
F003	Carbon disulfide
F005	Cyclohexanone
	Methanol

Note: Treatment standards for these constituents apply to F001 F005 wastes which contain only one, two, or all three of these constituents.

Check only one, if applicable.

EPA Waste Code	Constituents in the waste
☐ F005	☐ Containing 2-nitropropane as the only listed F001 - F005 solvent.
	☐ Containing 2-ethoxyethanol as the only listed F001 - F005 solvent.

NOTIFICATION FOR OTHER "F" WASTES

Check only one, if applicable.

☐ F006
☐ F007
☐ F008
☐ F009
☐ F027

Figure 3a-2 (Continued)
Land Disposal Restrictions Notification Form

Los Alamos
National Laboratory

LAND DISPOSAL RESTRICTIONS NOTIFICATION FORM

NOTIFICATION FOR "P" AND "U" LISTED WASTE CODES

☐ P001	☐ P057	☐ P115	☐ U041	☐ U092	☐ U144	☐ U194
☐ P002	☐ P058	☐ P116	☐ U042	☐ U093	☐ U145	☐ U196
☐ P003	☐ P059	☐ P118	☐ U043	☐ U094	☐ U146	☐ U197
☐ P004	☐ P060	☐ P119	☐ U044	☐ U095	☐ U147	☐ U200
☐ P005	☐ P062	☐ P120	☐ U045	☐ U096	☐ U148	☐ U201
☐ P006	☐ P063	☐ P121	☐ U046	☐ U097	☐ U149	☐ U202
☐ P007	☐ P064	☐ P122	☐ U047	☐ U098	☐ U150	☐ U203
☐ P008	☐ P065	☐ P123	☐ U048	☐ U099	☐ U151	☐ U204
☐ P009	☐ P066		☐ U049	☐ U101	☐ U152	☐ U205
☐ P010	☐ P067		☐ U050	☐ U102	☐ U153	☐ U206
☐ P011	☐ P068		☐ U051	☐ U103	☐ U154	☐ U207
☐ P012	☐ P069	☐ U001	☐ U052	☐ U105	☐ U155	☐ U208
☐ P013	☐ P070	☐ U002	☐ U053	☐ U106	☐ U156	☐ U209
☐ P014	☐ P071	☐ U003	☐ U055	☐ U107	☐ U157	☐ U210
☐ P015	☐ P072	☐ U004	☐ U056	☐ U108	☐ U158	☐ U211
☐ P016	☐ P073	☐ U005	☐ U057	☐ U109	☐ U159	☐ U213
☐ P017	☐ P074	☐ U006	☐ U058	☐ U110	☐ U160	☐ U214
☐ P018	☐ P075	☐ U007	☐ U059	☐ U111	☐ U161	☐ U215
☐ P020	☐ P076	☐ U008	☐ U060	☐ U112	☐ U162	☐ U216
☐ P021	☐ P077	☐ U009	☐ U061	☐ U113	☐ U163	☐ U217
☐ P022	☐ P078	☐ U010	☐ U062	☐ U114	☐ U164	☐ U218
☐ P023	☐ P081	☐ U011	☐ U063	☐ U115	☐ U165	☐ U219
☐ P024	☐ P082	☐ U012	☐ U064	☐ U116	☐ U166	☐ U220
☐ P026	☐ P084	☐ U014	☐ U066	☐ U117	☐ U167	☐ U221
☐ P027	☐ P085	☐ U015	☐ U067	☐ U118	☐ U168	☐ U222
☐ P028	☐ P087	☐ U016	☐ U068	☐ U119	☐ U169	☐ U223
☐ P029	☐ P088	☐ U017	☐ U069	☐ U120	☐ U170	☐ U225
☐ P030	☐ P089	☐ U018	☐ U070	☐ U121	☐ U171	☐ U226
☐ P031	☐ P092	☐ U019	☐ U071	☐ U122	☐ U172	☐ U227
☐ P033	☐ P093	☐ U020	☐ U072	☐ U123	☐ U173	☐ U228
☐ P034	☐ P094	☐ U021	☐ U073	☐ U124	☐ U174	☐ U234
☐ P036	☐ P095	☐ U022	☐ U074	☐ U125	☐ U176	☐ U235
☐ P037	☐ P096	☐ U023	☐ U075	☐ U126	☐ U177	☐ U236
☐ P038	☐ P097	☐ U024	☐ U076	☐ U127	☐ U178	☐ U237
☐ P039	☐ P098	☐ U025	☐ U077	☐ U128	☐ U179	☐ U238
☐ P040	☐ P099	☐ U026	☐ U078	☐ U129	☐ U180	☐ U239
☐ P041	☐ P101	☐ U027	☐ U079	☐ U130	☐ U181	☐ U240
☐ P042	☐ P102	☐ U028	☐ U080	☐ U131	☐ U182	☐ U243
☐ P043	☐ P103	☐ U029	☐ U081	☐ U132	☐ U183	☐ U244
☐ P044	☐ P104	☐ U030	☐ U082	☐ U133	☐ U184	☐ U246
☐ P045	☐ P105	☐ U031	☐ U083	☐ U134	☐ U185	☐ U247
☐ P046	☐ P106	☐ U032	☐ U084	☐ U135	☐ U186	☐ U248
☐ P047	☐ P108	☐ U033	☐ U085	☐ U136	☐ U187	☐ U249
☐ P048	☐ P109	☐ U034	☐ U086	☐ U137	☐ U188	☐ U328
☐ P049	☐ P110	☐ U035	☐ U087	☐ U138	☐ U189	☐ U353
☐ P050	☐ P111	☐ U036	☐ U088	☐ U140	☐ U190	☐ U359
☐ P051	☐ P112	☐ U037	☐ U089	☐ U141	☐ U191	
☐ P054	☐ P113	☐ U038	☐ U090	☐ U142	☐ U192	
☐ P056	☐ P114	☐ U039	☐ U091	☐ U143	☐ U193	

Figure 3a-2 (Continued)
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TABLE UTS Universal Treatment Standards
(Check the applicable underlying hazardous constituents for D001, D002, and D012 D043 characteristic wastes only.)

Regulated constituent common name

- ☐ Acenaphthylene
- ☐ Acenaphthene
- ☐ Acetone
- ☐ Acetonitrile
- ☐ Acetophenone
- ☐ 2-Acetylaminofluorene
- ☐ Acrolein
- ☐ Acrylamide
- ☐ Acrylonitrile
- ☐ Aldrin
- ☐ 4-Aminobiphenyl
- ☐ Aniline
- ☐ Anthracene
- ☐ Aramite
- ☐ alpha-BHC
- ☐ beta-BHC
- ☐ delta-BHC
- ☐ gamma-BHC
- ☐ Benzene
- ☐ Benz(a)anthracene
- ☐ Benzal chloride
- ☐ Benzo(b)fluoranthene (difficult to distinguish from benzo(k)fluoranthene)
- ☐ Benzo(k)fluoranthene (difficult to distinguish from benzo(b)fluoranthene)
- ☐ Benzo(g,h,i)perylene
- ☐ Benzo(a)pyrene
- ☐ Bromodichloromethane
- ☐ Methyl bromide (Bromomethane)
- ☐ 4-Bromophenyl phenyl ether
- ☐ n-Butyl alcohol
- ☐ Butyl benzyl phthalate
- ☐ 2-sec-Butyl-4,6-dinitrophenol (Dinoseb)
- ☐ Carbon disulfide
- ☐ Carbon tetrachloride
- ☐ Chlordane (alpha and gamma isomers)
- ☐ p-Chloroaniline
- ☐ Chlorobenzene
- ☐ Chlorobenzilate
- ☐ 2-Chloro-1,3-butadiene
- ☐ Chlorodibromomethane
- ☐ Chloroethane
- ☐ bis(2-Chloroethoxy)methane
- ☐ bis(2-Chloroethyl)ether
- ☐ Chloroform
- ☐ bis(2-Chloroisopropyl)ether
- ☐ p-Chloro-m-cresol
- ☐ 2-Chloroethyl vinyl ether
- ☐ Chloromethane (Methyl chloride)
- ☐ 2-Chloronaphthalene
- ☐ 2-Chlorophenol
- ☐ 3-Chloropropylene
- ☐ Chrysene
- ☐ o-Cresol
- ☐ m-Cresol (difficult to distinguish from p-cresol)
- ☐ p-Cresol (difficult to distinguish from m-cresol)
- ☐ Cyclohexanone
- ☐ 1,2-Dibromo-3-chloropropane
- ☐ Ethylene dibromide (1,2-Dibromoethane)
- ☐ Dibromomethane
- ☐ 2,4-D (2,4-Dichlorophenoxyacetic acid)
- ☐ o,p -DDD
- ☐ p,p -DDD
- ☐ o,p -DDE
- ☐ p,p -DDE
- ☐ o,p -DDT
- ☐ p,p -DDT
- ☐ Dibenz(a,h)anthracene
- ☐ Dibenz(a,e)pyrene
- ☐ m-Dichlorobenzene
- ☐ o-Dichlorobenzene
- ☐ p-Dichlorobenzene
- ☐ Dichlorodifluoromethane
- ☐ 1,1-Dichloroethane
- ☐ 1,2-Dichloroethane
- ☐ 1,1-Dichloroethylene
- ☐ trans-1,2-Dichloroethylene
- ☐ 2,4-Dichlorophenol
- ☐ 2,6-Dichlorophenol
- ☐ 1,2-Dichloropropane
- ☐ cis-1,3-Dichloropropylene
- ☐ trans-1,3-Dichloropropylene
- ☐ Dieldrin
- ☐ Diethyl phthalate
- ☐ 2-4,Dimethyl phenol
- ☐ Dimethyl phthalate
- ☐ Di-n-butyl phthalate
- ☐ 1,4-Dinitrobenzene

Figure 3a-2 (Continued)
Land Disposal Restrictions Notification Form

TABLE UTS Universal Treatment Standards
(Check the applicable underlying hazardous constituents for D001, D002, and D012 D043 characteristic wastes only.)

Regulated constituent common name

- ☐ 4,6-Dinitro-o-cresol
- ☐ 2,4-Dinitrophenol
- ☐ 2,4-Dinitrotoluene
- ☐ 2,6-Dinitrotoluene
- ☐ Di-n-octyl phthalate
- ☐ p-Dimethylaminoazobenzene
- ☐ Di-n-propylnitrosamine
- ☐ 1,4-Dioxane
- ☐ Diphenylamine (difficult to distinguish from diphenylnitrosamine)
- ☐ Diphenylnitrosamine (difficult to distinguish from diphenylamine)
- ☐ 1,2-Diphenylhydrazine
- ☐ Disulfoton
- ☐ Endosulfan I
- ☐ Endosulfan II
- ☐ Endosulfan sulfate
- ☐ Endrin
- ☐ Endrin aldehyde
- ☐ Ethyl acetate
- ☐ Ethyl cyanide (Propanenitrile)
- ☐ Ethyl benzene
- ☐ Ethyl ether
- ☐ bis(2-Ethylhexyl) phthalate
- ☐ Ethyl methacrylate
- ☐ Ethylene oxide
- ☐ Famphur
- ☐ Fluoranthene
- ☐ Fluorene
- ☐ Heptachlor
- ☐ Heptachlor epoxide
- ☐ Hexachlorobenzene
- ☐ Hexachlorobutadiene
- ☐ Hexachlorocyclopentadiene
- ☐ HxCDDs (All Hexachlorodibenzo-p-dioxins)
- ☐ HxCDFs (All Hexachlorodibenzofurans)
- ☐ Hexachloroethane
- ☐ Hexachloropropylene
- ☐ Indeno (1,2,3-c,d) pyrene
- ☐ Iodomethane
- ☐ Isobutyl alcohol
- ☐ Isodrin
- ☐ Isosafrole
- ☐ Kepone
- ☐ Methacrylonitrile
- ☐ Methanol
- ☐ Methapyrilene
- ☐ Methoxychlor
- ☐ 3-Methylcholanthrene
- ☐ 4,4-Methylene bis(2-chloroaniline)
- ☐ Methylene chloride
- ☐ Methyl ethyl ketone
- ☐ Methyl isobutyl ketone
- ☐ Methyl methacrylate
- ☐ Methyl methansulfonate
- ☐ Methyl parathion
- ☐ Naphthalene
- ☐ 2-Naphthylamine
- ☐ o-Nitroaniline
- ☐ p-Nitroaniline
- ☐ Nitrobenzene
- ☐ 5-Nitro-o-toluidine
- ☐ o-Nitrophenol
- ☐ p-Nitrophenol
- ☐ N-Nitrosodiethylamine
- ☐ N-Nitrosodimethylamine
- ☐ N-Nitroso-di-n-butylamine
- ☐ N-Nitrosomethylethylamine
- ☐ N-Nitrosomorpholine
- ☐ N-Nitrosopiperidine
- ☐ N-Nitrosopyrrolidine
- ☐ Parathion
- ☐ Total PCBs (sum of all PCB isomers, or all Aroclors)
- ☐ Pentachlorobenzene
- ☐ PeCDDs (All Pentachlorodibenzo-p-dioxins)
- ☐ PeCDFs (All Pentachlorodibenzofurans)
- ☐ Pentachloroethane
- ☐ Pentachloronitrobenzene
- ☐ Pentachlorophenol
- ☐ Phenacetin
- ☐ Phenanthrene
- ☐ Phenol
- ☐ Phorate
- ☐ Phthalic acid
- ☐ Phthalic anhydride
- ☐ Pronamide
- ☐ Pyrene
- ☐ Pyridine
- ☐ Safrole
- ☐ Silvex (2,4,5-TP)

Figure 3a-2 (Continued)
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TABLE UTS Universal Treatment Standards
(Check the applicable underlying hazardous constituents for D001, D002, and D012 D043 characteristic wastes only.)

Regulated constituent common name

- ☐ 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)
- ☐ 1,2,4,5-Tetrachlorobenzene
- ☐ TCDDs (All Tetrachlorodibenzo-p-dioxins)
- ☐ TCDFs (All Tetrachlorodibenzofurans)
- ☐ 1,1,1,2-Tetrachloroethane
- ☐ 1,1,2,2-Tetrachloroethane
- ☐ Tetrachloroethylene
- ☐ 2,3,4,6-Tetrachlorophenol
- ☐ Toluene
- ☐ Toxaphene
- ☐ Bromoform (Tribromomethane)
- ☐ 1,2,4-Trichlorobenzene
- ☐ 1,1,1-Trichloroethane
- ☐ 1,1,2-Trichloroethane
- ☐ Trichloroethylene
- ☐ Trichloromonofluoromethane
- ☐ 2,4,5-Trichlorophenol
- ☐ 2,4,6-Trichlorophenol
- ☐ 1,2,3-Trichloropropane
- ☐ 1,1,2-Trichloro-1,2,2-trifluoroethane
- ☐ tris-(2,3-Dibromopropyl) phosphate
- ☐ Vinyl chloride
- ☐ Xylenes-mixed isomers (sum of o-, m-, and p-xylene concentrations)
- ☐ Antimony
- ☐ Arsenic
- ☐ Barium
- ☐ Beryllium
- ☐ Cadmium
- ☐ Chromium (Total)
- ☐ Cyanides (Total)[1]
- ☐ Cyanides (Amenable)[1]
- ☐ Fluoride
- ☐ Lead
- ☐ Mercury Nonwastewater from Retort
- ☐ Mercury All Others
- ☐ Nickel
- ☐ Selenium
- ☐ Silver
- ☐ Sulfide
- ☐ Thallium
- ☐ Vanadium

[1] Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, as incorporated by reference in 40 CFR 260.11, with a sample size of 10 grams and a distillation time of one hour and 15 minutes.

NOTIFICATION OF ADDITIONAL TREATMENT STANDARDS

EPA Waste Code	Waste Description and/or Subcategory (if applicable)

Figure 3a-2 (Continued)
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Table 3a-1

Description of RCRA[a] Hazardous and Low-Level Solid Mixed Waste Stored at Technical Area (TA) 16, Building 88

Waste Description	Waste-Generating Process Description	TA Where Waste Is Generated	Basis for Characterization	Potential EPA[b] Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits[c] (milligrams per liter)
Reactive waste	Classified information	TA-16	Process knowledge	D001	Ignitability	Not applicable (NA)[d]
				D003	Reactivity	NA[d]
				D005	Barium	100.0
				D008	Lead	5.0
				D009	Mercury	0.2

[a] Resource Conservation and Recovery Act.
[b] U.S. Environmental Protection Agency.
[c] A solid waste exhibits the characteristic of toxicity if the extract from a representative sample of the waste contains any of the contaminants listed at a concentration equal to or greater than the respective value given in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, 261, Subpart D.
[d] Not applicable: Refers to the absence of regulatory limits for ignitable, corrosive, and reactive characteristic wastes.

Table 3a-2

Parameters, Characterization Methods, and Rationale for Hazardous and Low-Level Solid Mixed Waste Stored at Technical Area (TA) 16, Building 88

Waste Description	Analytical Parameter[a]	Characterization Method	Rationale
Reactive waste	– Ignitability – Reactivity – RCRA-regulated metals	– Acceptable knowledge[b]	– Determine characteristic for ignitability and reactivity – Determine toxicity characteristic

a Parameter selection is based on process knowledge for this waste stream. Additional parameters may be selected as necessary.

b According to U.S. Environmental Protection Agency (EPA), 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C., "acceptable knowledge" is broadly defined as process knowledge, waste analysis data (e.g., sampling and analysis), and/or facility records of analysis performed before the effective date of Resource Conservation and Recovery Act regulations.

WASTE ANALYSIS PLAN FOR THERMAL TREATMENT BY OPEN BURNING AT TECHNICAL AREA 16

LIST OF REGULATORY REFERENCES AND CORRESPONDING WASTE ANALYSIS PLAN LOCATION

RCRA[a] Regulatory Reference 20 NMAC 4.1[b], Subparts V, VIII, and IX	Description of Requirement	Location in the Waste Analysis Plan
264.13(a)(1)	Analysis information adequate to meet Parts 264 and 268 treatment requirements	3b.2 and 3b.3
264.13(a)(2)	Waste analysis data	3b.3.2
264.13(a)(3)	Repeat analysis	Not applicable (NA)
264.13(a)(4)	Inspection and analysis after each movement of hazardous waste received from off-site	NA
264.13(b)	Written waste analysis plan	Entire document
264.13(b)(1)	Parameters and rationale for selection	3b.2.1 and 3b. 2.2
264.13(b)(2)	Test methods	3b.3.3
264.13(b)(3)	Representative sample collection method	NA
264.13(b)(4)	Frequency for review or repeat of initial analysis	3b.3.3
264.13(b)(5)	Waste analysis information agreed upon for off-site facilities	3b.3.1, 3b.3.2, and Figure 3b-1
264.13(b)(6)	Additional waste analysis requirements	NA
264.13(b)(7)	Surface impoundments exempted under Part 268.4(a)	NA
264.13(c)	Inspection and analysis procedures for off-site facilities	NA
264.13(c)(1)	Procedures for identification of each movement of waste for off-site shipments	NA
264.13(c)(2)	Sampling method for the waste to be identified for off-site shipments	NA
264.13(c)(3)	For off-site landfills: procedures to determine whether a biodegradable sorbent has been added to containers	NA
268.7(a)	Determination of whether waste is restricted from land disposal	3b.4.2
268.7(b)	Testing requirements for treatment facilities	NA
268.7(b)(1)	Testing of treatment residues or extract of waste with concentration based treatment standards specified in Part 268.41	3b.4.2
268.7(b)(2)	Testing of treatment residues pursuant to Part 268.32	NA
268.7(b)(3)	Testing of treatment residues of waste with concentration based treatment standards specified in Part 268.43	3b.4.2

See footnotes at end of table.

LIST OF REGULATORY REFERENCES AND CORRESPONDING WASTE ANALYSIS PLAN LOCATION (Continued)

RCRA[a] Regulatory Reference 20 NMAC 4.1[b], Subparts V, VIII, and IX	Description of Requirement	Location in the Waste Analysis Plan
268.7(b)(4)	Notice requirements	3b.4.2 and Figure 3b-2
268.7(b)(5)	Certification of compliance with Part 268	3b.4.2
268.7(b)(6)	Notice and certification requirements for treatment facilities that ship treatment residues to a different treatment, storage, or disposal facility	NA
268.7(b)(7)	Notice requirement for recycling facilities using materials in a manner constituting disposal	NA
268.7(c)(1)	Record-keeping requirements for land disposal facilities	NA
268.7(c)(2)	Testing requirements for land disposal facilities	NA
268.7(d)(1)	Notification requirements for excluded debris (i.e., pursuant to Part 261.3)	NA
268.7(d)(2)	Updated notification requirements for debris	NA
268.7(d)(3)	Documentation and certification requirements for debris excluded under Part 261.3(e)(1)	NA
270.14(b)(2)	Chemical and physical analyses	3b.2, 3b.3, Figure 3b-1, and Table 3b-2

[a] Resource Conservation and Recovery Act.
[b] New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), which adopts, with a few limited exceptions, Title 40 of the Code of Federal Regulations (40 CFR), Parts 260-270 (1993). 20 NMAC 4.1, Subparts V, VIII, and IX, contain equivalent regulations to 40 CFR Parts 264, 268, and 270, respectively.

LIST OF DEFINITIONS

Acceptable knowledge - A term broadly defined to include process knowledge, waste analysis data, and/or facility records of analysis.

Heterogeneous waste - Waste that is of dissimilar or diverse composition.

High explosive - An explosive with a nitroglycerin base requiring a detonator; the explosion is violent and nearly instantaneous.

Homogeneous waste - Waste that is of uniform composition.

Open burning - The combustion of any material without the following characteristics: (1) control of combustion air to maintain adequate temperature for efficient combustion, (2) containment of the combustion reaction in an enclosed device to provide sufficient residence time and mixing for complete combustion, and (3) control of emission of the gaseous combustion products, pursuant to the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart I, 260.10.

Process knowledge - Described in 20 NMAC 4.1, Subpart V, Section 264.13(a)(2), as data developed under Subpart II, and existing published or documented data on a specific hazardous waste or on hazardous waste generated from similar processes.

Resource Conservation and Recovery Act (RCRA) hazardous waste - The criteria for establishing a waste as a RCRA hazardous waste are provided in 20 NMAC 4.1, Subpart II. A waste is considered hazardous if it meets the definition of a RCRA solid waste; is not exempted from regulation; and exhibits one or more of the characteristics described in 20 NMAC 4.1, Subpart II, Subpart C, or is listed in 20 NMAC 4.1, Subpart II, Subpart D.

RCRA solid waste - Any waste stream that meets the definition of a "solid waste" as specified in 20 NMAC 4.1, Subpart II, 261.2.

Solid waste - Any waste stream in a solid physical form. In this document, use of the term solid waste refers only to the solid physical form and has no additional regulatory meaning.

Thermal treatment - The treatment of hazardous waste in a device that uses elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of the hazardous waste, pursuant to 20 NMAC 4.1, Subpart I, 260.10.

3b.0 WASTE ANALYSIS PLAN FOR THERMAL TREATMENT BY OPEN BURNING AT TECHNICAL AREA 16

This waste analysis plan (WAP) presents information on the chemical and physical nature of Resource and Conservation and Recovery Act (RCRA)-hazardous high-explosive (HE) waste treated at Los Alamos National Laboratory (LANL). The waste analysis information contained herein is specific to thermal treatment by open burning (OB) (see List of Definitions) at Technical Area (TA) 16. Waste analysis requirements are specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart IX, 270.14(b)(2); in 20 NMAC 4.1, Subpart V, 264.13, "General Waste Analysis"; and in 20 NMAC 4.1, Subpart VIII, 268.7, "Waste Analysis and Recordkeeping." The content of this WAP generally follows the guidance provided in "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual" (U.S. Environmental Protection Agency [EPA], 1994b); and in "RCRA Part B Permit Writers' Guidance Manual for Department of Defense Open Burning/Open Detonation Units" (U.S. Army Environmental Hygiene Agency [AEHA], 1987).

This WAP is organized as follows. Section 3b.1 includes a facility description, information on RCRA-hazardous HE waste-generating processes and activities, identification of RCRA-hazardous HE waste managed, and associated RCRA-hazardous HE waste treatment units. Section 3b.2 presents waste parameters, including the criteria and rationale for selection. Section 3b.3 includes requirements for the characterization of RCRA-hazardous HE waste. Section 3b.4 addresses special procedural requirements, including procedures to ensure compliance with land disposal restriction (LDR) requirements.

3b.1 FACILITY DESCRIPTION

LANL is located in Los Alamos County in north-central New Mexico. It is approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. LANL, which is divided into 49 TAs, and the associated residential and commercial areas of Los Alamos County are situated on the Pajarito Plateau. The principal mission of LANL includes the research, design, development, and analysis of weapons components for the nation's nuclear arsenal; supporting research programs; energy research and environmental missions; and environmental management programs. LANL is owned by the U.S. Department of Energy (DOE) and is operated jointly by DOE and the University of California.

3b.1.1 Facility Waste-Generating Processes, Activities, and Identification of RCRA Hazardous Wastes Managed

RCRA-hazardous HE waste is generated at LANL primarily from research and development activities. Table 3b-1 provides a summary of available information on RCRA-hazardous HE waste treated by OB at LANL, including brief waste descriptions, waste-generating processes, generating locations, the characterization basis for hazardous waste designation (i.e., process knowledge and/or analysis), potential EPA Hazardous Waste Number(s), potential hazardous constituents in and/or characteristics of the waste, and regulatory limits. Standard operating procedure (SOP) WX-3, 12.1.0 references SOP WX-3, 1.1.0, which includes a list of allowable explosives that may be treated by OB at the TA-16 burn ground.

3b.1.1.1 Homogeneous RCRA-Hazardous HE Waste

Homogeneous (i.e., uniform composition) RCRA-hazardous HE wastes treated by OB at LANL are described generally in the following paragraphs.

HE-Contaminated Water with Solvent

HE-contaminated water with solvent is generated at TA-9 and TA-16. This waste consists primarily of water and solvent from laboratory analysis and/or solvents from HE processing.

Spent Solvent Waste

Spent solvent waste is generated at TA-9 and TA-16. This waste consists of spent solvents used to dissolve HE and polymers and spent solvents from laboratory analysis.

HE-Contaminated Water

HE-contaminated water is generated at TA-9, TA-11, TA-16, TA-22, and TA-40, primarily from pressure-washing walls, equipment, and floors and from water-cooled HE-machining operations.

HE-Contaminated Used Oil

HE-contaminated used oil is generated at TA-9 and TA-16 from hydraulic presses and lubrication systems associated with HE-machining operations.

Solid and Scrap HE

Solid HE is generated at TA-9, TA-11, TA-16, TA-28, TA-37, and TA-40 from HE preparation. It consists of off-specification or obsolete HE. Scrap HE is generated at the same TAs from machining and forming processes.

HE-Contaminated Environmental Restoration (ER) Soil

ER soil potentially contaminated with HE is generated at LANL from remedial activities, including investigation-derived waste.

HE-Contaminated Commercial Chemical Products

HE-contaminated commercial chemical products may be generated at various TAs throughout LANL that manage HE. This waste may consist of spilled or off-specification unused commercial chemical products potentially contaminated with HE.

Waste Water Treatment Sludge from HE Processing

Waste water treatment sludge from HE processing is generated at TA-16-401 and TA-16-406. HE-contaminated water with solvent and HE-contaminated water are poured into a filter vessel which separates the liquid to form a sludge.

Spent Carbon From the Treatment of HE-Contaminated Waste Water

Spent carbon from the treatment of HE-contaminated waste water is generated at TA-16-288. This carbon is in the form of spent filters from the Experimental Treatment Facility.

3b.1.1.2 Heterogeneous RCRA-Hazardous HE Waste

Heterogeneous (i.e., dissimilar or diverse composition) RCRA-hazardous HE wastes treated by OB at TA-16 are described generally in the following paragraphs.

HE-Contaminated Trash

HE-contaminated trash is generated at TA-9, TA-11, TA-16, TA-22, TA-37, and TA-40, and may include solvent-contaminated discarded paper, glassware, tools, and other trash from HE-processing activities, plastic forming, and from general office and laboratory use.

HE-Contaminated Equipment

HE-contaminated equipment is generated at TA-9, TA-11, and TA-16 and includes discarded, noncombustible equipment and material from HE-processing areas.

HE-Contaminated Waste Rags and Wipes

HE-contaminated waste rags and wipes are generated at TA-9 and TA-16. This waste includes solvent soaked rags and wipes used at HE-processing areas (e.g., hydraulic press operations, laboratory analysis, or other miscellaneous uses).

Liquid Acids, Bases, and/or Inorganic Salts

Liquid acids, bases, and/or inorganic salts are generated at TA-9. This waste may consist of materials used as titrates, solvents, cleaning fluids, and/or materials from hydrolysis research.

3b.1.2 Description of OB Units

The OB thermal treatment unit and subunits at TA-16 are currently operating under RCRA interim status. The subunits include:

- TA-16-387 Flash Pad
- TA-16-388 Burn Pad
- TA-16-394 Burn Tray
- TA-16-399 Burn Pad
- TA-16-401 Filter Vessels
- TA-16-406 Filter Vessels

RCRA-hazardous HE waste is not stored at the OB thermal treatment unit at TA-16. Information on this unit and associated subunits is available in LANL's "RCRA Part A Permit Application for Mixed Waste," Revision 2.0 (LANL, 1994b) and in LANL's "RCRA Part B Permit Application," Revision 4.1 (LANL, 1988).

3b.2 WASTE PARAMETERS [20 NMAC 4.1, Subpart V, 264.13(a)(1)]

A detailed chemical and physical characterization based solely on process knowledge will be performed prior to thermal treatment of RCRA-hazardous HE waste, as required by RCRA. Parameter selection and waste characterization of HE waste is based solely on process knowledge due to the potential safety problems associated with management of this material, the lack of laboratory capability for chemical analysis of HE waste, and the fact that the EPA manual titled "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) (EPA, 1992a) has no applicable required methodology for characterization of HE waste. Process knowledge provides complete and adequate characterization for the safe and compliant treatment of HE waste by OB. Waste parameters will be selected to ensure that this characterization will contain all information necessary to properly treat waste in accordance with RCRA general facility standards and LDR requirements. Characterization will be performed using the procedures described in Section 3b.3.

3b.2.1 Proposed Characterization Parameters and Methods [20 NMAC 4.1, Subpart V, 264.13(b)(1), and Subpart IX, 270.14(b)(2)]

Proposed parameters, characterization methods, and rationale for RCRA-hazardous HE waste at LANL are summarized in Table 3b-2. The parameters listed in Table 3b-2 were selected based on process knowledge for the various homogeneous and heterogeneous waste forms described in Section 3b.1.1.

3b.2.2 Criteria and Rationale for Parameter Selection [20 NMAC 4.1, Subpart V, 264.13(b)(1)]

Waste analysis parameters were selected to characterize RCRA-hazardous HE waste in conformance with RCRA regulatory requirements. These parameters are based on knowledge of raw materials and physical/chemical processes of waste-generating activities, and may be supported by limited analytical results. The rationale for the selected parameters are identified in Table 3b-2.

3b.3 CHARACTERIZATION OF HE WASTE

RCRA hazardous HE wastes generated by testing and experiments are readily characterized by process knowledge. This is primarily because the composition and reactive characteristics of these materials are well documented. Established HE must have fairly consistent chemical composition for successful experimental usage. Off-specification HE has the same composition as product HE. In addition, only allowable explosive material and/or experimental explosives/components (refer to Appendix D, SOP WX-3, 1.1.0) are used at LANL by the Engineering Sciences and Applications (ESA), Dynamics Testing (DX), and Materials Science and Technology (MST) Divisions.

If plans are made to treat a RCRA-hazardous HE waste that has not previously been treated by OB, LANL will collect enough information to effectively characterize this waste stream and document the characterization prior to initiating the treatment process.

3b.3.1 Waste Profiling System [20 NMAC 4.1, Subpart V, 264.13(a)(3), 264.13(b)(4) and (5), and Subpart IX, 270.14(b)(2)]

In an effort to maintain detailed and accurate waste characterization information, LANL's Hazardous and Solid Waste Group (ESH-19) and the Chemical Science and Technology (CST) Division use a generator waste-profiling program. RCRA-hazardous HE waste is characterized using process knowledge, which is provided by individual waste generators on LANL's Waste Profile Form (WPF). The WPF is described in detail below and in LANL's Administrative Requirement 10-9, "Waste Profile Form." The waste-profiling effort requires each waste

generator to provide a detailed written description of the waste on a standardized WPF (Figure 3b-1). The waste description can be based on generator process knowledge (as is the case for RCRA-hazardous HE waste), the use of appropriate Material Safety Data Sheets (MSDS), and/or the results of a chemical/physical analysis of the specific waste. By completing the WPF, waste generators supply information that allows for proper management of RCRA-hazardous HE waste. Specific waste information requested on the WPF includes:

- Point of generation
- Method of characterization
- Waste categories
- Waste description
- Waste origination
- Classification of radioactivity
- Presence of toxic metals and an estimate of concentration
- Presence of organic compounds and an estimate of concentration
- Identification of hazardous constituents
- Identification of hazardous characteristics.

A correctly completed WPF contains enough data to allow ESH-19 to classify the waste as either non-RCRA-regulated waste, RCRA-regulated solid waste (i.e., regulated under RCRA Subtitle D), RCRA-regulated hazardous waste (i.e., regulated under RCRA Subtitle C), or radioactive waste. These four waste classifications are each divided into categories that further distinguish specific wastes. For example, RCRA-regulated hazardous waste is categorized as ignitable, reactive, corrosive or toxicity characteristic, and any additional chemical constituents must be listed. For radioactive waste, activation products, fission products, transuranic radionuclides contamination type, and other general information serves to distinguish specific wastes. These categories are identified on the WPF. By associating a waste with an individual category, ESH-19 can accurately classify the waste and assign it the appropriate EPA Hazardous Waste Number(s). The accuracy of information provided on the WPF as well as the resulting waste classification is reviewed by ESH-19 and CST. Ultimately, the waste profile can be used by CST to determine the proper procedures for management of the waste. This information, combined with TA-specific SOPs regarding the constituent concentrations of allowable explosives, serves to adequately characterize RCRA-hazardous HE waste prior to treatment.

All waste generators must certify, based on their knowledge of the waste, that the information on the WPF is complete and accurate. Knowingly providing false information can result in administrative action by LANL.

The WPF must be completed prior to any waste treatment, storage, or disposal. Waste generators must provide new profiles when a process change results in a change in waste composition or when a new waste is generated; otherwise, WPFs are reevaluated annually pursuant to 20 NMAC 4.1, Subpart V, 264.13(b)(4).

3b.3.2 Acceptable Knowledge [20 NMAC 4.1, Subpart V, 264.13(a)(2) and 264.13(b)(5), and Subpart IX, 270.14(b)(2)]

The physical and chemical nature of RCRA-hazardous HE waste forms (e.g., debris, equipment, and instruments) makes the collection of representative samples impractical, difficult, and dangerous. Dangers to human health and the environment associated with unnecessary handling of HE wastes combined with the lack of analytical laboratories capable of accepting and analyzing HE waste restrict extensive sampling and analysis activities. Due to these constraints, process knowledge alone is adequate to characterize RCRA-hazardous HE wastes at LANL. In addition, difficulty arises from several factors, some of which include: waste streams that contain disparate elements; large objects cannot be made to fill standard size sample containers; disparate elements may need to be segregated into similar forms; and laboratories may not have the capability to sample large objects (EPA, 1992b).

According to EPA guidance, *acceptable knowledge* is broadly defined to include process knowledge, waste analysis data, and/or facility records of analysis (EPA, 1994b). *Process knowledge* is described in 20 NMAC 4.1, Subpart V, Section 264.13(a)(2), as data developed under Subpart II, and existing published or documented data on a specific hazardous waste or on hazardous waste generated from similar processes. *Waste analysis data* include concentration(s) of RCRA-regulated constituents and/or results of tests for hazardous characteristics. These data are used to determine whether wastes are RCRA-regulated and to determine LDR status. *Facility records of analysis* performed before the effective date of RCRA regulations will be used with caution. These analytical results must be accurate and applicable to the specified waste and should be supplemented with other existing information (e.g., published data). Examples presented in the EPA guidance as to when application of acceptable knowledge may be appropriate include:

- Wastes containing hazardous constituents from specific processes that are well documented, such as F-listed and/or K-listed waste code descriptions.

- Wastes consisting of discarded unused commercial chemical products, reagents, or chemicals of known physical and chemical constituents. Several of these fall into the P-listed and U-listed categories.

- Wastes containing heterogeneous materials, where the physical nature of the waste does not lend itself to taking a representative sample (e.g., laboratory trash and construction debris with surface contamination) (EPA, 1994b).

At LANL, waste generators will obtain, assemble, and prepare the acceptable knowledge documentation available for each waste stream in a separate auditable file or maintain a waste stream reference file that identifies the acceptable knowledge documents and their locations. The acceptable knowledge documentation must be explicitly relevant and traceable to a waste type and must not be merely a list of information sources for a particular operation and waste. There are many sources of applicable documentation at LANL that may be used to substantiate acceptable knowledge for a specific waste stream. Examples of documentation that may be used include the following:

- Process design documents (e.g., Title II Design).

- Preliminary and final safety analysis reports, unreviewed safety question determinations, and technical safety requirements.

- SOPs and detailed operating procedures, which can include lists of raw materials or reagents, describe the process/experiment that uses the materials, and describe the wastes generated and how the wastes are handled.

- Waste packaging logs.

- Test plans or research project reports that describe the reagents and other raw materials used in an experiment.

- Site databases (e.g., chemical inventory database for Superfund Amendments and Reauthorization Act Title III requirements).

- Information from site personnel (e.g., documented interviews).

- Standard industry practice documents (e.g., vendor information).

- Industry reports on a similar process can be useful when there is a clear connection between the LANL process/experiment and the industry's similar process/experiment.

- Analytical data from studies of common industry processes that are similar to LANL processes. These data can be used to identify the constituents in a specific "similar" process waste stream and to determine the regulatory status of the waste.

- MSDSs, product labels, and other product package information.

- Documented visual inspections to confirm or identify the physical characteristics and packaging of a waste.

- Laboratory notebooks that detail the research processes and raw materials used in an experiment.

3b.3.3 Sampling and Analysis for RCRA-Hazardous HE Waste

The inherent nature of most RCRA-hazardous HE waste streams makes sampling and analysis dangerous. Only very limited types of sampling and analysis may be conducted safely (e.g., HE-contaminated wastewater and slurries may be tested at an on-site laboratory at LANL to confirm the presence and relative concentrations of HE in these waste forms). This analysis is done by high-performance liquid chromatography, EPA Test Method M8330. Due to the possible handling dangers associated with HE and reactive waste materials, LANL will rely on process knowledge to characterize these wastes. LANL personnel routinely use established HE products of consistent chemical composition for research. Historically, HE waste materials have successfully undergone thermal treatment by OB with no additional or alternative procedures required. Reevaluation of a HE waste will occur if different raw materials (different formulation) are used in the product HE.

If plans are made to treat a waste that has not previously been treated by OB, LANL will collect enough information to effectively characterize this waste stream prior to initiating the treatment process.

Changes in waste-generating processes will be verified through an annual recharacterization evaluation. In addition, if the newly generated waste is of a different composition or if waste verification inspections indicate a discrepancy between the waste and its WPF, the process knowledge will be reevaluated.

3b.3.4 Sampling and Analysis of Ash Generated by OB

Ash generated as the result of thermal treatment by OB is analyzed for toxicity characteristic barium (D005) prior to disposal. Ash generated from any waste stream which contains listed hazardous waste is considered "derived from" waste and is sent to a permitted treatment, storage, or disposal facility for proper disposal. A summary of waste characterization techniques for ash generated by OB is included in Table 3b-3.

3b.4 SPECIAL PROCEDURAL REQUIREMENTS

Additional waste management requirements that are specific to ignitable, reactive, and incompatible wastes, as well as in compliance with LDR, are described below.

3b.4.1 Procedures for Ignitable, Reactive, and Incompatible Wastes [20 NMAC 4.1, Subpart V, 264.17]

LANL personnel will take all precautions necessary to prevent accidental ignition or reaction of ignitable and/or reactive waste managed at TA-16. All wastes treated by OB at LANL are ignitable, reactive, or both. Therefore, LANL will rely on SOPs for specific safety and handling procedures associated with the treatment of HE waste.

3b.4.2 Procedures to Ensure Compliance with LDR Requirements [20 NMAC 4.1, Subpart VIII, 268.7(a) and 268.7(b)(3), (4), and (5)]

In accordance with the LDR regulations specified in 20 NMAC 4.1, Subpart VIII, Part 268, Subpart D, treatment standards are expressed in two ways: (1) as constituent concentrations in the waste (from either an extract of the waste, as determined by the toxicity characteristic leaching procedure, or from the total volume of the waste, referred to as total waste analysis) or (2) as specified treatment technologies. Wastes that must meet concentration-based treatment standards prior to disposal will be evaluated to determine if applicable constituent concentration levels have been attained. This will be accomplished by testing the ash generated from the OB process, or by using acceptable knowledge (EPA, 1994b). For example, ash accumulated after the thermal treatment of a waste stream that contained a listed hazardous waste is handled as a "derived from" waste and sent off-site to a permitted hazardous waste treatment facility. Testing will be conducted only to certify that a waste meets LDR treatment standards. If a waste meets applicable LDR treatment standards based on acceptable knowledge, then testing to certify LDR compliance is not necessary. HE waste (i.e., ignitable and/or reactive) has a specified treatment technology of deactivation; therefore, verification through analysis is not necessary. All HE-contaminated waste must be treated by OB following specific SOPs. HE-contaminated equipment and material is inspected after the flash period and certified to be adequately treated

by a Certifying Agent. All certification documentation and any analytical results completed in support of LDR requirements will be retained within the facility operating record.

Any wastes that are determined through analysis to meet treatment standards as specified in 20 NMAC 4.1, Subpart VIII, Part 268, Subpart D, will be land disposed in a permitted facility without further treatment. An LDR notification form (Figure 3b-2), including all analytical records to support the notification, will be prepared and will accompany the shipment of waste to the receiving facility.

Los Alamos
National Laboratory

WASTE PROFILE FORM

Account Information

For rapid processing, complete **all sections** in black or blue ink and mail this form to Waste Services Group at MS J579

Reference Number

Waste Generator's Name (Print)	Znumber	Waste Management Coordinator's Name (Print)	Znumber

Generator's Group	Generator's Telephone	Generator's Mail Stop	Waste Stream Technical Area	Building	Room

Waste Accumulation
Check as many as apply.

- ☐ Satellite accumulation area --> site no.: _____
- ☐ Less than 90 day accumulation area --> site no.: _____
- ☐ Radioactive Materials Management Area (RMMA) --> site no.: _____
- ☐ None of the above

Method of Characterization
Check as many as apply.

- ☐ Acceptable Knowledge (AK)
- ☐ Analysis attached --> sample/request no. _____
- ☐ MSDS attached
- ☐ Request for analysis

Section 1- Chemical and Physical Characteristics

For help in completing this section of the form, call 5-WAST or 5-4000.

Waste Type
Check only one.

- ☐ Unused/unspent chemical
  Check *Waste Classes* and *Associated Documentation* Only
- ☐ Process waste/spent chemical
  Complete all of Section 1.

Waste Classes
Check as many as apply.

- ☐ On-going generation
- ☐ One-time generation
- ☐ Radioactive (complete Sec. 2)
- ☐ Non-radioactive
- ☐ Wastewater (complete Sec. 3)
- ☐ Classified/Sensitive

Associated Documentation
Check as many as apply.

- ☐ Process SOP --> no.: _____
- ☐ RMMA OP --> no.: _____
- ☐ WM SOP --> no.: _____
- ☐ Other --> _____
- ☐ None --> describe below

Waste Category
Check as many as apply.

- ☐ Solvent
- ☐ Degreaser
- ☐ Dioxin
- ☐ Electroplating
- ☐ Treated hazardous waste residue
- ☐ Explosive process waste
- ☐ Infectious/biological waste
- ☐ Beryllium
- ☐ Asbestos-friable
- ☐ Asbestos-nonfriable
- ☐ Empty containers
- ☐ PCB (<50 ppm)
  - ☐ PCB (50 - 500 ppm)
  - ☐ PCB (> 500 ppm)
  - → id. no. : _____
- ☐ Not applicable --> describe below

Waste Sources
Check as many as apply.

- ☐ Research and development
- ☐ Maintenance
- ☐ Construction
- ☐ Material processing
- ☐ Decon/decom
- ☐ Investigation derived
- ☐ Remediation
- ☐ UST - petroleum
- ☐ UST - non-petroleum
- ☐ Generator treatment
- ☐ Interim/permitted treatment
- ☐ Industrial sludge
- ☐ Sanitary sludge
- ☐ Abatement

Waste Matrix
Check only one.

Gas

- ☐ ≤ 1.5 Atmospheres
- ☐ > 1.5 Atmospheres

Liquid

- ☐ Aqueous
- ☐ Organic
- ☐ Inorganic

Solid

- ☐ Powder/ash
- ☐ Solid
- ☐ Absorbed liquid

Matrix Type
Check only one.

- ☐ Homogeneous
- ☐ Heterogeneous --> describe below

Waste/Process Description

_____
_____
_____
_____
_____
_____
_____

Figure 3b-1
Waste Profile Form

Section 1- Chemical and Physical Characteristics (continued)

Ignitability (degrees F.)
Check only one.

- ☐ < 73
- ☐ 73-99
- ☐ 100-139
- ☐ 140-200
- ☐ > 200
- ☐ Ignitable solid
- ☐ DOT oxidizer
- ☐ Not ignitable

Corrosivity (pH)
Check only one.

- ☐ ≤ 2.0
- ☐ 2.1-4.0
- ☐ 4.1-6.0
- ☐ 6.1-9.0
- ☐ 9.1-12.4
- ☐ ≥ 12.5
- ☐ Liquid corrosive to steel
- ☐ Not aqueous

Reactivity
Check as many as apply.

- ☐ Unstable
- ☐ Water reactive
- ☐ Pyrophoric
- ☐ Cyanide bearing
- ☐ Sulfide bearing
- ☐ Shock sensitive
- ☐ Explosive - class _____
- ☐ Non-reactive

Boiling Point (degrees F.)
Check only one.

- ☐ ≤ 95
- ☐ > 95
- ☐ Not applicable

Identify presence of contaminants.			Minimum	Maximum	Unit (ppm or % only)	Analytical method
Toxicity Characteristic Metals						
Arsenic	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Barium	☐ None	☐ < 100.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Cadmium	☐ None	☐ < 1.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Chromium	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Lead	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Mercury	☐ None	☐ < 0.2 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Selenium	☐ None	☐ < 1.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Silver	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Toxicity Characteristic Organic Compounds						
Benzene	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Carbon tetrachloride	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Chlorobenzene	☐ None	☐ < 100.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Chloroform	☐ None	☐ < 6.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Cresol	☐ None	☐ < 200.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
1,4-dichlorobenzene	☐ None	☐ < 7.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
1,2-Dichloroethane	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
1,1-Dichloroethylene	☐ None	☐ < 0.7 ppm	_____	to _____	_____	☐ TCLP ☐ Total
2,4-Dinitrotoluene	☐ None	☐ < 0.13 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Hexachlorobenzene	☐ None	☐ < 0.13 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Hexachlorobutadiene	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Hexachloroethane	☐ None	☐ < 3.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Methyl ethyl ketone	☐ None	☐ < 200.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Nitrobenzene	☐ None	☐ < 2.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Pentachlorophenol	☐ None	☐ < 100.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Pyridine	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Perchloroethylene or tetrachloroethylene	☐ None	☐ < 0.7 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Trichloroethylene	☐ None	☐ < 0.5 ppm	_____	to _____	_____	☐ TCLP ☐ Total
2,4,5-Trichlorophenol	☐ None	☐ < 400.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
2,4,6-Trichlorophenol	☐ None	☐ < 2.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Vinyl chloride	☐ None	☐ < 0.2 ppm	_____	to _____	_____	☐ TCLP ☐ Total

Additional Chemical Constituents and Contaminants (for hazardous constituents, see AR 10-3, Appendix A)
List all other constituents (including inerts) not identified above and attach any applicable analyses.

Name of constituent	Cas no.(optional)	Minimum	Maximum	Unit (ppm or % only)
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____
_____	_____	_____	to _____	_____

Figure 3b-1 (Continued)
Waste Profile Form

Section 2- Radiological Characteristics

For help in completing this section of the form, call 5-WAST or 5-4000.

	Range minimum		Range maximum	Unit (Ci/g or Ci/l)
General				
☐ Alpha	_____	to	_____	_____
☐ Beta	_____	to	_____	_____
☐ Gamma	_____	to	_____	_____
TRU radionuclides				
☐ None present				
☐ Am-241	_____	to	_____	_____
☐ Am-243	_____	to	_____	_____
☐ Cf-249	_____	to	_____	_____
☐ Cf-251	_____	to	_____	_____
☐ Cm-243	_____	to	_____	_____
☐ Cm-245	_____	to	_____	_____
☐ Cm-247	_____	to	_____	_____
☐ Pu-238	_____	to	_____	_____
☐ Pu-239	_____	to	_____	_____
☐ Pu-240	_____	to	_____	_____
☐ Pu-242	_____	to	_____	_____
Fission products				
☐ None present				
☐ Ba-140	_____	to	_____	_____
☐ Ce-144	_____	to	_____	_____
☐ Cs-134	_____	to	_____	_____
☐ Cs-137	_____	to	_____	_____
☐ I-129	_____	to	_____	_____
☐ I-133	_____	to	_____	_____
☐ Kr-85	_____	to	_____	_____
☐ Nb-95	_____	to	_____	_____
☐ Ru-106	_____	to	_____	_____
☐ Sb-125	_____	to	_____	_____
☐ Sr-90	_____	to	_____	_____
☐ Tc-99	_____	to	_____	_____
☐ Zr-93	_____	to	_____	_____
☐ Zr-95	_____	to	_____	_____
Activation products				
☐ None present				
☐ As -74	_____	to	_____	_____
☐ Be-7	_____	to	_____	_____
☐ C-14	_____	to	_____	_____
☐ Co-56	_____	to	_____	_____
☐ Co-57	_____	to	_____	_____
☐ Co-58	_____	to	_____	_____
☐ Co-60	_____	to	_____	_____
☐ Cr-51	_____	to	_____	_____
☐ Eu-152	_____	to	_____	_____
☐ Mn-52	_____	to	_____	_____
☐ Mn-54	_____	to	_____	_____
☐ Nb-94	_____	to	_____	_____
☐ Ni-59	_____	to	_____	_____
☐ Ni-63	_____	to	_____	_____
☐ Rb-83	_____	to	_____	_____
☐ Rb-84	_____	to	_____	_____
☐ Se-75	_____	to	_____	_____
☐ Sr-82	_____	to	_____	_____
☐ Sr-85	_____	to	_____	_____
☐ V-48	_____	to	_____	_____
☐ Y-88	_____	to	_____	_____
☐ Zn-65	_____	to	_____	_____
☐ Zr-88	_____	to	_____	_____

	Range minimum		Range maximum	Unit (Ci/g or Ci/l)
Other				
☐ None present				
☐ Am-242	_____	to	_____	_____
☐ Bi-207	_____	to	_____	_____
☐ Bi-210	_____	to	_____	_____
☐ Cf-250	_____	to	_____	_____
☐ Cf-252	_____	to	_____	_____
☐ Cm-244	_____	to	_____	_____
☐ H-3	_____	to	_____	_____
☐ Pa-231	_____	to	_____	_____
☐ Pb-210	_____	to	_____	_____
☐ Po-210	_____	to	_____	_____
☐ Pu-236	_____	to	_____	_____
☐ Pu-241	_____	to	_____	_____
☐ Ra-226	_____	to	_____	_____
☐ Ra-228	_____	to	_____	_____
☐ Th-230	_____	to	_____	_____
☐ Th-232	_____	to	_____	_____
☐ U-232	_____	to	_____	_____
☐ U-233	_____	to	_____	_____
☐ U-234	_____	to	_____	_____
☐ U-235	_____	to	_____	_____
☐ U-236	_____	to	_____	_____
☐ U-238	_____	to	_____	_____
Add'l radionuclides				
☐ No additional radionuclides present				
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____
_____	_____	to	_____	_____

Contamination Type: *Check as many as apply.*

☐ Volume Contamination

☐ Surface Contamination

Form 1346 (1/95)

Figure 3b-1 (Continued)
Waste Profile Form

Section 3 - Wastewater Characteristics

For help in completing this section of the form, call 7-4301.

Identify presence of contaminants			Minimum	Maximum	Unit (ppm or % only)	Analytical method
Aluminum	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Boron	☐ None	☐ < 5.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Cobalt	☐ None	☐ < 1.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Copper	☐ None	☐ < 1.0 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Vanadium	☐ None	☐ < 0.10 ppm	_____	to _____	_____	☐ TCLP ☐ Total
Zinc	☐ None	☐ < 95.4 ppm	_____	to _____	_____	☐ TCLP ☐ Total

Maximum daily flow when discharge occurs: _____ ☐ Gallons ☐ Liters

Average daily flow when discharge occurs: _____ ☐ Gallons ☐ Liters

Estimated number of days per year that discharge will occur: _____

Estimated total volume per year discharged to the Radioactive Liquid Waste Collection System at TA-50-1: _____ ☐ Gallons ☐ Liters

For TA-55 use only. Wastewater will be discharged through one of the following:

☐ Acid line ☐ Caustic line ☐ Industrial waste line

Section 4 - Additional Information

If additional information is available on the chemical, physical, or radiological character of the waste not covered on this form, provide it below:

WASTE GENERATOR CERTIFICATION: *Based on my knowledge of the waste and/or chemical/physical analysis, I certify that the information on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.*

Signature	Date

Figure 3b-1 (Continued)
Waste Profile Form

Los Alamos
National Laboratory

LAND DISPOSAL RESTRICTIONS NOTIFICATION FORM

A copy of this form must be attached to each Waste Profile Form and to each Uniform Hazardous Waste Manifest required to transport waste within LANL, pursuant to 40 CFR 268.7(a)(1).

Waste Profile Form No.	Chemical Waste/ Waste Disposal Record No.	Uniform Hazardous Waste Manifest No.	Date of Waste Pickup

Check only one.

- ☐ Non-wastewater
- ☐ Wastewater [as defined in 40 CFR 268.2(f)]

NOTIFICATION OF CALIFORNIA LIST APPLICABILITY

Check all that apply.

- ☐ Liquid hazardous waste containing PCBs at a concentration of ≥50 ppm.
- ☐ A D001 – D017 liquid waste containing ≥134 mg/L of nickel and/or ≥130 mg/L of thallium.
- ☐ A D001 – D011 waste containing Halogenated Organic Compounds (HOCs) listed in 40 CFR 268, Appendix III, at ≥1000 ppm.

NOTIFICATION OF "D" CHARACTERISTIC EPA WASTE CODES

Check all that apply.

EPA Waste Code	Waste Description and/or Subcategory (as needed)
☐ D001*	Ignitable characteristic wastes [except for the Section 261.21(a)(1) High TOC Subcategory] that are managed in non-CWA/non-CWA-equivalent/non-Class I SDWA systems.
☐ D001	High TOC Ignitable Characteristic Liquids Subcategory based on 40 CFR 261.21(a)(1) - Greater than 10% total organic carbon.
☐ D002*	Corrosive Characteristic Wastes that are managed in non-CWA/non-CWA-equivalent/non-Class I SDWA systems.
☐ D003	Reactive Sulfides Subcategory
☐ D003	Reactive Cyanides Subcategory
☐ D003	Water Reactive Subcategory
☐ D003	Other Reactives Subcategory [based on 261.23(a)(1)]
☐ D004	
☐ D005	
☐ D006	Wastes that exhibit the TC for cadmium
☐ D006	Cadmium Containing Batteries Subcategory
☐ D007	
☐ D008	Wastes that exhibit TC for lead
☐ D008	Lead Acid Batteries Subcategory
☐ D008	Radioactive Lead Solids Subcategory
☐ D009	High Mercury-Organic Subcategory (≥260 mg/kg Hg with organics and not incinerator residues)
☐ D009	High Mercury-Inorganic Subcategory (≥260 mg/kg Hg [with inorganics])
☐ D009	Low Mercury Subcategory (<260 mg/kg Hg)
☐ D009	All D009 wastewaters
☐ D009	Elemental mercury contaminated with radioactive materials.
☐ D009	Hydraulic oil contaminated with Mercury Radioactive Materials Subcategory
☐ D010	
☐ D011	

☐ D012*	☐ D020*	☐ D028*	☐ D036*
☐ D013*	☐ D021*	☐ D029*	☐ D037*
☐ D014*	☐ D022*	☐ D030*	☐ D038*
☐ D015*	☐ D023*	☐ D031*	☐ D039*
☐ D016*	☐ D024*	☐ D032*	☐ D040*
☐ D017*	☐ D025*	☐ D033*	☐ D041*
☐ D018*	☐ D026*	☐ D034*	☐ D042*
☐ D019*	☐ D027*	☐ D035*	☐ D043*

*All applicable Underlying Hazardous Constituents in these characteristic wastes must be checked in Table UTS.

Figure 3b-2
Land Disposal Restrictions Notification Form

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National Laboratory

LAND DISPOSAL RESTRICTIONS NOTIFICATION FORM

NOTIFICATION FOR F001 – F005 SPENT SOLVENT WASTES

Check all that apply.

Spent solvent wastes with the following constituents only.

EPA Waste Code	Constituents in the waste	
☐ F001	☐ Acetone	☐ Isobutyl alcohol
☐ F002	☐ Benzene	☐ Methanol
☐ F003	☐ n-Butyl alcohol	☐ Methylene chloride
☐ F004	☐ Carbon disulfide (wastewater only)	☐ Methyl ethyl ketone
☐ F005	☐ Carbon tetrachloride	☐ Methyl isobutyl ketone
	☐ Chlorobenzene	☐ Nitrobenzene
	☐ o-cresol	☐ Pyridine
	☐ m-cresol	☐ Tetrachloroethylene
	☐ p-cresol	☐ Toluene
	☐ Cresol-mixed isomers (Cresylic acid)	☐ 1,1,1-Trichloroethane
	☐ Cyclohexanone (wastewater only)	☐ 1,1,2-Trichloroethane
	☐ o-Dichlorobenzene	☐ 1,1,2-Trichloro – 1,2,2-trifluoroethane
	☐ Ethyl acetate	☐ Trichloroethylene
	☐ Ethyl benzene	☐ Trichloromonofluoromethane
	☐ Ethyl ether	☐ Xylenes – mixed isomers (o-, m-, p-xylene)

Check all that apply.

EPA Waste Codes	Constituents in the waste
☐ F003	☐ Carbon disulfide
☐ F005	☐ Cyclohexanone
	☐ Methanol

Note: Treatment standards for these constituents apply to F001 – F005 wastes which contain only one, two, or all three of these constituents.

Check only one, if applicable.

EPA Waste Code	Constituents in the waste
☐ F005	☐ Containing 2-nitropropane as the only listed F001 – F005 solvent.
	☐ Containing 2-ethoxyethanol as the only listed F001 – F005 solvent.

NOTIFICATION FOR OTHER "F" WASTES

Check only one, if applicable.

- ☐ F006
- ☐ F007
- ☐ F008
- ☐ F009
- ☐ F027

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LAND DISPOSAL RESTRICTIONS NOTIFICATION FORM

NOTIFICATION FOR "P" AND "U" LISTED WASTE CODES

☐ P001	☐ P057	☐ P115	☐ U041	☐ U092	☐ U144	☐ U194
☐ P002	☐ P058	☐ P116	☐ U042	☐ U093	☐ U145	☐ U196
☐ P003	☐ P059	☐ P118	☐ U043	☐ U094	☐ U146	☐ U197
☐ P004	☐ P060	☐ P119	☐ U044	☐ U095	☐ U147	☐ U200
☐ P005	☐ P062	☐ P120	☐ U045	☐ U096	☐ U148	☐ U201
☐ P006	☐ P063	☐ P121	☐ U046	☐ U097	☐ U149	☐ U202
☐ P007	☐ P064	☐ P122	☐ U047	☐ U098	☐ U150	☐ U203
☐ P008	☐ P065	☐ P123	☐ U048	☐ U099	☐ U151	☐ U204
☐ P009	☐ P066		☐ U049	☐ U101	☐ U152	☐ U205
☐ P010	☐ P067		☐ U050	☐ U102	☐ U153	☐ U206
☐ P011	☐ P068		☐ U051	☐ U103	☐ U154	☐ U207
☐ P012	☐ P069	☐ U001	☐ U052	☐ U105	☐ U155	☐ U208
☐ P013	☐ P070	☐ U002	☐ U053	☐ U106	☐ U156	☐ U209
☐ P014	☐ P071	☐ U003	☐ U055	☐ U107	☐ U157	☐ U210
☐ P015	☐ P072	☐ U004	☐ U056	☐ U108	☐ U158	☐ U211
☐ P016	☐ P073	☐ U005	☐ U057	☐ U109	☐ U159	☐ U213
☐ P017	☐ P074	☐ U006	☐ U058	☐ U110	☐ U160	☐ U214
☐ P018	☐ P075	☐ U007	☐ U059	☐ U111	☐ U161	☐ U215
☐ P020	☐ P076	☐ U008	☐ U060	☐ U112	☐ U162	☐ U216
☐ P021	☐ P077	☐ U009	☐ U061	☐ U113	☐ U163	☐ U217
☐ P022	☐ P078	☐ U010	☐ U062	☐ U114	☐ U164	☐ U218
☐ P023	☐ P081	☐ U011	☐ U063	☐ U115	☐ U165	☐ U219
☐ P024	☐ P082	☐ U012	☐ U064	☐ U116	☐ U166	☐ U220
☐ P026	☐ P084	☐ U014	☐ U066	☐ U117	☐ U167	☐ U221
☐ P027	☐ P085	☐ U015	☐ U067	☐ U118	☐ U168	☐ U222
☐ P028	☐ P087	☐ U016	☐ U068	☐ U119	☐ U169	☐ U223
☐ P029	☐ P088	☐ U017	☐ U069	☐ U120	☐ U170	☐ U225
☐ P030	☐ P089	☐ U018	☐ U070	☐ U121	☐ U171	☐ U226
☐ P031	☐ P092	☐ U019	☐ U071	☐ U122	☐ U172	☐ U227
☐ P033	☐ P093	☐ U020	☐ U072	☐ U123	☐ U173	☐ U228
☐ P034	☐ P094	☐ U021	☐ U073	☐ U124	☐ U174	☐ U234
☐ P036	☐ P095	☐ U022	☐ U074	☐ U125	☐ U176	☐ U235
☐ P037	☐ P096	☐ U023	☐ U075	☐ U126	☐ U177	☐ U236
☐ P038	☐ P097	☐ U024	☐ U076	☐ U127	☐ U178	☐ U237
☐ P039	☐ P098	☐ U025	☐ U077	☐ U128	☐ U179	☐ U238
☐ P040	☐ P099	☐ U026	☐ U078	☐ U129	☐ U180	☐ U239
☐ P041	☐ P101	☐ U027	☐ U079	☐ U130	☐ U181	☐ U240
☐ P042	☐ P102	☐ U028	☐ U080	☐ U131	☐ U182	☐ U243
☐ P043	☐ P103	☐ U029	☐ U081	☐ U132	☐ U183	☐ U244
☐ P044	☐ P104	☐ U030	☐ U082	☐ U133	☐ U184	☐ U246
☐ P045	☐ P105	☐ U031	☐ U083	☐ U134	☐ U185	☐ U247
☐ P046	☐ P106	☐ U032	☐ U084	☐ U135	☐ U186	☐ U248
☐ P047	☐ P108	☐ U033	☐ U085	☐ U136	☐ U187	☐ U249
☐ P048	☐ P109	☐ U034	☐ U086	☐ U137	☐ U188	☐ U328
☐ P049	☐ P110	☐ U035	☐ U087	☐ U138	☐ U189	☐ U353
☐ P050	☐ P111	☐ U036	☐ U088	☐ U140	☐ U190	☐ U359

Figure 3b-2 (Continued)
Land Disposal Restrictions Notification Form

TABLE UTS—Universal Treatment Standards
(Check the applicable underlying hazardous constituents for D001, D002, and D012 –D043 characteristic wastes only.)

Regulated constituent—common name

- ☐ Acenaphthylene
- ☐ Acenaphthene
- ☐ Acetone
- ☐ Acetonitrile
- ☐ Acetophenone
- ☐ 2-Acetylaminofluorene
- ☐ Acrolein
- ☐ Acrylamide
- ☐ Acrylonitrile
- ☐ Aldrin
- ☐ 4-Aminobiphenyl
- ☐ Aniline
- ☐ Anthracene
- ☐ Aramite
- ☐ alpha-BHC
- ☐ beta-BHC
- ☐ delta-BHC
- ☐ gamma-BHC
- ☐ Benzene
- ☐ Benz(a)anthracene
- ☐ Benzal chloride
- ☐ Benzo(b)fluoranthene (difficult to distinguish from benzo(k)fluoranthene)
- ☐ Benzo(k)fluoranthene (difficult to distinguish from benzo(b)fluoranthene)
- ☐ Benzo(g,h,i)perylene
- ☐ Benzo(a)pyrene
- ☐ Bromodichloromethane
- ☐ Methyl bromide (Bromomethane)
- ☐ 4-Bromophenyl phenyl ether
- ☐ n-Butyl alcohol
- ☐ Butyl benzyl phthalate
- ☐ 2-sec-Butyl-4,6-dinitrophenol (Dinoseb)
- ☐ Carbon disulfide
- ☐ Carbon tetrachloride
- ☐ Chlordane (alpha and gamma isomers)
- ☐ p-Chloroaniline
- ☐ Chlorobenzene
- ☐ Chlorobenzilate
- ☐ 2-Chloro-1,3-butadiene
- ☐ Chlorodibromomethane
- ☐ Chloroethane
- ☐ bis(2-Chloroethoxy)methane
- ☐ bis(2-Chloroethyl)ether
- ☐ Chloroform
- ☐ bis(2-Chloroisopropyl)ether
- ☐ p-Chloro-m-cresol
- ☐ 2-Chloroethyl vinyl ether
- ☐ Chloromethane (Methyl chloride)
- ☐ 2-Chloronaphthalene
- ☐ 2-Chlorophenol
- ☐ 3-Chloropropylene
- ☐ Chrysene
- ☐ o-Cresol
- ☐ m-Cresol (difficult to distinguish from p-cresol)
- ☐ p-Cresol (difficult to distinguish from m-cresol)
- ☐ Cyclohexanone
- ☐ 1,2-Dibromo-3-chloropropane
- ☐ Ethylene dibromide (1,2-Dibromoethane)
- ☐ Dibromomethane
- ☐ 2,4-D (2,4-Dichlorophenoxyacetic acid)
- ☐ o,p'-DDD
- ☐ p,p'-DDD
- ☐ o,p'-DDE
- ☐ p,p'-DDE
- ☐ o,p'-DDT
- ☐ p,p'-DDT
- ☐ Dibenz(a,h)anthracene
- ☐ Dibenz(a,e)pyrene
- ☐ m-Dichlorobenzene
- ☐ o-Dichlorobenzene
- ☐ p-Dichlorobenzene
- ☐ Dichlorodifluoromethane
- ☐ 1,1-Dichloroethane
- ☐ 1,2-Dichloroethane
- ☐ 1,1-Dichloroethylene
- ☐ trans-1,2-Dichloroethylene
- ☐ 2,4-Dichlorophenol
- ☐ 2,6-Dichlorophenol
- ☐ 1,2-Dichloropropane
- ☐ cis-1,3-Dichloropropylene
- ☐ trans-1,3-Dichloropropylene
- ☐ Dieldrin
- ☐ Diethyl phthalate
- ☐ 2-4,Dimethyl phenol
- ☐ Dimethyl phthalate
- ☐ Di-n-butyl phthalate
- ☐ 1,4-Dinitrobenzene

Figure 3b-2 (Continued)
Land Disposal Restrictions Notification Form

TABLE UTS—Universal Treatment Standards
(Check the applicable underlying hazardous constituents for D001, D002, and D012 –D043 characteristic wastes only.)

Regulated constituent—common name

- ☐ 4,6-Dinitro-o-cresol
- ☐ 2,4-Dinitrophenol
- ☐ 2,4-Dinitrotoluene
- ☐ 2,6-Dinitrotoluene
- ☐ Di-n-octyl phthalate
- ☐ p-Dimethylaminoazobenzene
- ☐ Di-n-propylnitrosamine
- ☐ 1,4-Dioxane
- ☐ Diphenylamine (difficult to distinguish from diphenylnitrosamine)
- ☐ Diphenylnitrosamine (difficult to distinguish from diphenylamine)
- ☐ 1,2-Diphenylhydrazine
- ☐ Disulfoton
- ☐ Endosulfan I
- ☐ Endosulfan II
- ☐ Endosulfan sulfate
- ☐ Endrin
- ☐ Endrin aldehyde
- ☐ Ethyl acetate
- ☐ Ethyl cyanide (Propanenitrile)
- ☐ Ethyl benzene
- ☐ Ethyl ether
- ☐ bis(2-Ethylhexyl) phthalate
- ☐ Ethyl methacrylate
- ☐ Ethylene oxide
- ☐ Famphur
- ☐ Fluoranthene
- ☐ Fluorene
- ☐ Heptachlor
- ☐ Heptachlor epoxide
- ☐ Hexachlorobenzene
- ☐ Hexachlorobutadiene
- ☐ Hexachlorocyclopentadiene
- ☐ HxCDDs (All Hexachlorodibenzo-p-dioxins)
- ☐ HxCDFs (All Hexachlorodibenzofurans)
- ☐ Hexachloroethane
- ☐ Hexachloropropylene
- ☐ Indeno (1,2,3-c,d) pyrene
- ☐ Iodomethane
- ☐ Isobutyl alcohol
- ☐ Isodrin
- ☐ Isosafrole
- ☐ Kepone
- ☐ Methacrylonitrile
- ☐ Methanol
- ☐ Methapyrilene
- ☐ Methoxychlor
- ☐ 3-Methylcholanthrene
- ☐ 4,4-Methylene bis(2-chloroaniline)
- ☐ Methylene chloride
- ☐ Methyl ethyl ketone
- ☐ Methyl isobutyl ketone
- ☐ Methyl methacrylate
- ☐ Methyl methansulfonate
- ☐ Methyl parathion
- ☐ Naphthalene
- ☐ 2-Naphthylamine
- ☐ o-Nitroaniline
- ☐ p-Nitroaniline
- ☐ Nitrobenzene
- ☐ 5-Nitro-o-toluidine
- ☐ o-Nitrophenol
- ☐ p-Nitrophenol
- ☐ N-Nitrosodiethylamine
- ☐ N-Nitrosodimethylamine
- ☐ N-Nitroso-di-n-butylamine
- ☐ N-Nitrosomethylethylamine
- ☐ N-Nitrosomorpholine
- ☐ N-Nitrosopiperidine
- ☐ N-Nitrosopyrrolidine
- ☐ Parathion
- ☐ Total PCBs (sum of all PCB isomers, or all Aroclors)
- ☐ Pentachlorobenzene
- ☐ PeCDDs (All Pentachlorodibenzo-p-dioxins)
- ☐ PeCDFs (All Pentachlorodibenzofurans)
- ☐ Pentachloroethane
- ☐ Pentachloronitrobenzene
- ☐ Pentachlorophenol
- ☐ Phenacetin
- ☐ Phenanthrene
- ☐ Phenol
- ☐ Phorate
- ☐ Phthalic acid
- ☐ Phthalic anhydride
- ☐ Pronamide
- ☐ Pyrene
- ☐ Pyridine
- ☐ Safrole
- ☐ Silvex (2,4,5-TP)

Figure 3b-2 (Continued)
Land Disposal Restrictions Notification Form

Los Alamos
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LAND DISPOSAL RESTRICTIONS NOTIFICATION FORM

TABLE UTS—Universal Treatment Standards
(Check the applicable underlying hazardous constituents for D001, D002, and D012 –D043 characteristic wastes only.)

Regulated constituent—common name

- ☐ 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)
- ☐ 1,2,4,5-Tetrachlorobenzene
- ☐ TCDDs (All Tetrachlorodibenzo-p-dioxins)
- ☐ TCDFs (All Tetrachlorodibenzofurans)
- ☐ 1,1,1,2-Tetrachloroethane
- ☐ 1,1,2,2-Tetrachloroethane
- ☐ Tetrachloroethylene
- ☐ 2,3,4,6-Tetrachlorophenol
- ☐ Toluene
- ☐ Toxaphene
- ☐ Bromoform (Tribromomethane)
- ☐ 1,2,4-Trichlorobenzene
- ☐ 1,1,1-Trichloroethane
- ☐ 1,1,2-Trichloroethane
- ☐ Trichloroethylene
- ☐ Trichloromonofluoromethane
- ☐ 2,4,5-Trichlorophenol
- ☐ 2,4,6-Trichlorophenol
- ☐ 1,2,3-Trichloropropane
- ☐ 1,1,2-Trichloro-1,2,2-trifluoroethane
- ☐ tris-(2,3-Dibromopropyl) phosphate
- ☐ Vinyl chloride
- ☐ Xylenes-mixed isomers (sum of o-, m-, and p-xylene concentrations)
- ☐ Antimony
- ☐ Arsenic
- ☐ Barium
- ☐ Beryllium
- ☐ Cadmium
- ☐ Chromium (Total)
- ☐ Cyanides (Total)[1]
- ☐ Cyanides (Amenable)[1]
- ☐ Fluoride
- ☐ Lead
- ☐ Mercury—Nonwastewater from Retort
- ☐ Mercury—All Others
- ☐ Nickel
- ☐ Selenium
- ☐ Silver
- ☐ Sulfide
- ☐ Thallium
- ☐ Vanadium

[1] Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, as incorporated by reference in 40 CFR 260.11, with a sample size of 10 grams and a distillation time of one hour and 15 minutes.

NOTIFICATION OF ADDITIONAL TREATMENT STANDARDS

EPA Waste Code	Waste Description and/or Subcategory (if applicable)

Figure 3b-2 (Continued)
Land Disposal Restrictions Notification Form

Table 3b-1

Descriptions of Hazardous Waste Treated by Open Burning at Los Alamos National Laboratory

Waste Description	Waste-Generating Process Description	Technical Areas (TA) Where Waste is Generated	Basis for Characterization	Potential EPA[a] Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits[b] (milligrams per liter)
Homogeneous Wastes						
High explosive (HE)-contaminated water with solvent	Laboratory analysis and/or HE processing	TA-16, TA-9	Process knowledge	D001 D003 F003	Ignitability Reactivity Spent nonhalogenated solvents	Not applicable (NA)[c] NA[c] NA[c]
HE-contaminated spent solvent waste	Laboratory analysis; dissolving HE and polymers	TA-16, TA-9	Process knowledge	D001 D003 D022 D028 D035 D038 F003 F005 U003	Ignitability Reactivity Chloroform 1,2-Dichloroethane Methyl ethyl ketone Pyridine Acetone Toluene Acetonitrile	NA[c] NA[c] 6.0 0.5 200.0 5.0 0.5 NA[c] NA[c]
HE-contaminated water	Pressure-washing walls, equipment and floors; and from water-cooled HE-machining operations	TA-16, TA-22	Process knowledge	D003	Reactivity	NA[c]
HE-contaminated used oil	Hydraulic presses and lubrication systems associated with HE-machining operating	TA-9, TA-16	Process knowledge	D003	Reactivity	NA[c]

Refer to footnotes at end of table.

Table 3b-1 (Continued)

Descriptions of Hazardous Waste Treated by Open Burning at Los Alamos National Laboratory

Waste Description	Waste-Generating Process Description	Technical Areas (TA) Where Waste is Generated	Basis for Characterization	Potential EPA[a] Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits[b] (milligrams per liter)
Homogeneous Wastes (Continued)						
Solid and scrap HE	Off-specification or obsolete HE; and from machining and forming HE	TA-9, TA-11,TA-16, TA-28, TA-37, and TA-40	Process knowledge	D003	Reactivity	NA[c]
HE-contaminated environmental restoration (ER) soil and/or debris Note: debris would be considered a heterogeneous waste	Waste generated during remediation and investigation-derived waste		Process knowledge and/or limited analysis	D003 D005 D006 D007 D008 D009 D011 D030 K044 F001 F002 F003 F005	Reactivity Barium Cadmium Chromium Lead Mercury Silver 2,4-Dinitrotoluene Waste water treatment sludge from explosives processing Spent halogenated solvents used in degreasing Spent halogenated solvents Spent nonhalogenated solvents Spent nonhalogenated solvents	NA[c] 100.0 1.0 5.0 5.0 0.2 5.0 0.13 NA[c] NA[c] NA[c] NA[c] NA[c]

Refer to footnotes at end of table.

Table 3b-1 (Continued)

Descriptions of Hazardous Waste Treated by Open Burning at Los Alamos National Laboratory

Waste Description	Waste-Generating Process Description	Technical Areas (TA) Where Waste is Generated	Basis for Characterization	Potential EPA[a] Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits[b] (milligrams per liter)
Heterogeneous Wastes						
Solvent/HE-contaminated trash, may include paper, glassware, tools, and other trash contaminated with solvents	HE processing, plastic forming, and from general office and laboratory use	TA-9, TA-11, TA-16,TA-22, TA-37, and TA-40	Process knowledge	D003 F001 F003	Reactivity Freon, Trichlorofluoroethane Acetone	NA[c] NA[c] NA[c]
HE-contaminated equipment	HE processing	TA-9, TA-11, and TA-16	Process knowledge	D003	Reactivity	NA[c]
HE-contaminated waste rags and wipes	HE processing, (e.g., hydraulic press operations, laboratory analysis, or other miscellaneous uses)	TA-16, TA-9	Process knowledge	D001 D003 F001 F002 F003 D022 U044 U003	Ignitability Reactivity 1,1,1-Trichloroethane 1,1,1-Trichloroethane Acetone Chloroform Chloroform Acetonitrile	NA[c] NA[c] NA[c] NA[c] NA[c] 6.0 NA[c] NA[c]
Liquid acids, bases, and/or inorganic salts	Materials used as titrates, solvents and cleaning fluids and material from hydrolysis research	TA-9	Process knowledge	D002 D003 D005 D007 D009	Corrosivity Reactivity Barium Chromium Mercury	NA[c] NA[c] 100.0 5.0 0.2

a U.S. Environmental Protection Agency.
b A solid waste exhibits the characteristic of toxicity if the extract from a representative sample of the waste contains any of the contaminants listed at a concentration equal to or greater than the respective value given in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart II, 261, Subpart D.
c Not applicable: refers to the absence of regulatory limits for ignitable, corrosive, reactive wastes, and F-, K-, and U-listed wastes.

Table 3b-2

Parameters, Characterization Methods, and Rationale for RCRA-Hazardous High Explosive (HE) Waste

Waste Description	Parameter[a]	Characterization Method	Rationale
Homogeneous Wastes			
HE-contaminated water with solvent	- Reactivity - Resource Conservation and Recovery Act (RCRA)-regulated organics	- Acceptable knowledge[b]	- Determine characteristic for reactivity - Determine the presence of K- and F-listed wastes from non-specific sources
HE-contaminated spent solvent waste	- Reactivity - RCRA-regulated organics	- Acceptable knowledge[b]	- Determine characteristic for ignitability and reactivity - Determine toxicity characteristic - Determine the presence of F-listed solvents
HE-contaminated water	- Reactivity	- Acceptable knowledge[b]	- Determine characteristic for reactivity - Determine the presence of K-listed waste from a non-specific source
HE-contaminated used oil	- Reactivity	- Acceptable knowledge[b]	- Determine characteristic for reactivity
Solid and scrap HE	- Reactivity	- Acceptable knowledge[b]	- Determine characteristic for reactivity
HE-contaminated environmental restoration (ER) soil and/or debris	- RCRA-regulated organics - Reactivity	- Acceptable knowledge[b]	- Determine characteristic for reactivity - Determine toxicity characteristic - Determine the presence of K- and F-listed wastes from non-specific sources
HE-contaminated commercial chemical products	- RCRA-regulated organics - Reactivity	- Acceptable knowledge[b]	- Determine the presence of U-listed wastes

Refer to footnotes at end of table.

Table 3b-2 (Continued)

Parameters, Characterization Methods, and Rationale for RCRA-Hazardous High Explosive (HE) Waste

Waste Description	Parameter[a]	Characterization Method	Rationale
Homogeneous Wastes (Continued)			
Waste water treatment sludges from the processing of HE	- RCRA-regulated organics - Reactivity	- Acceptable knowledge[b]	- Determine the presence of K- and F-listed wastes from non-specific sources
Spent carbon from the treatment of HE-contaminated waste water	- RCRA-regulated organics - Reactivity	- Acceptable knowledge[b]	- Determine the presence of K- and F-listed wastes from non-specific sources
Heterogeneous Wastes			
Solvent/HE-contaminated trash, may include paper, glassware, tools, and other trash contaminated with solvents	- Reactivity - RCRA-regulated organics	- Acceptable knowledge[b]	- Determine characteristic for reactivity - Determine the presence of F-listed solvents
HE-contaminated equipment	- Reactivity	- Acceptable knowledge[b]	- Determine characteristic for reactivity
HE-contaminated rags and wipes	- RCRA-regulated organics and metals - Ignitability - Reactivity	- Acceptable knowledge[b]	- Determine characteristic for ignitability and reactivity - Determine toxicity characteristic - Determine the presence of F-listed solvents
Liquid acids, bases, and/or inorganic salts	- RCRA-regulated metals - Corrosivity - Reactivity	- Acceptable knowledge[b]	- Determine characteristic for corrosivity and reactivity - Determine toxicity characteristic

[a] Parameter selection is based on process knowledge for each waste stream. Additional parameters may be selected for each waste stream as necessary.

[b] According to U.S. Environmental Protection Agency (EPA), 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C., acceptable knowledge is broadly defined as process knowledge, waste analysis data (e.g., sampling and analysis), and/or facility records of analysis performed before the effective date of Resource Conservation and Recovery Act regulations.

Table 3b-3

Summary of Waste Characterization Techniques for Ash Generated by Open Burning[a]

Constituent	Method Numbers	Test Method	Rationale
Metals in waste: Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	SW-846 (3051, 1311, 6010A, 7060A, 7061A)[b] (3051, 1311, 6010A, 7080A, 7081)[b] (3051, 1311, 6010A, 7130, 7131A)[b] (3051, 1311, 6010A, 7190, 7191)[b] (3051, 1311, 6010A, 7420, 7421)[b] (1311, 7470A, 7471A)[b] (3051, 1311, 6010A, 7740, 7741A, 7742)[b] (3051, 1311, 6010A, 7760A, 7761)[b] or equivalent methods[c]	Total and/or toxicity characteristic leaching procedure (TCLP) metals analysis Inductively-coupled plasma spectroscopy Atomic absorption spectroscopy Cold vapor atomic absorption spectroscopy Process knowledge for heterogeneous wastes	Determine total and/or TCLP metals concentrations in samples of solid process residues

[a] Currently, ash generated by open burning is only analyzed for barium.
[b] U.S. Environmental Protection Agency (EPA), 1992, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
[c] Equivalent methods, subject to EPA approval, may be substituted.

4.0 WASTE MANAGEMENT PRACTICES

The following sections describe the waste management practices at the Technical Area (TA) 16 burn ground and at the classified container storage area in Building 88. Photographs of these areas are included in the TA-16 Part A permit application, included as Attachment 1-1 of Section 1.0 of this permit application.

4.1 TA-16-88 CONTAINER STORAGE AREA

The classified container storage area located at Building 88 is an approximate 17 feet (ft) by 10 ft area to be used for storage of hazardous and low-level mixed waste (Figures 4-1 and 4-2). This area has a 275-gallon or 2,500 pound (lb) capacity. Containers that may be used for storage are 55-gallon drums, crates, boxes, small containers, and miscellaneous, irregularly-shaped containers. Materials will be compatible with containers. No free liquids are managed in this unit. Containers will be kept elevated using trays/pallets, with aisle space maintained to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of TA-16-88.

U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers managed in this area are included in the TA-16 Part A permit application (Section 1.0, Attachment 1-1). Maximum capacity is 275 gallons or 2,500 pounds (lbs) at any one time (assuming 500 lbs per 55-gallon drum).

4.2 CURRENT MANAGEMENT PRACTICES FOR THE OPEN BURN UNITS

The burning ground at TA-16 (Figure 4-3) is managed by Los Alamos National Laboratory (LANL)'s Engineering Science and Applications-Weapons Materials Applications (ESA-WMA) group, which is responsible for the safe treatment and handling of high-explosives (HE)-contaminated waste material generated by the HE production facilities. The group is also responsible for the safe handling of some HE-contaminated materials generated by Dynamic Experimentation (DX) Division that performs HE research and development. Several kinds of HE-contaminated waste materials are treated at the burning ground and include the following:

- Inert - mock explosives, may contain oxidizers
- Solid chunk - includes consolidated turnings, reject parts, and excess HE
- Sludge - HE sludge which settles out of wastewater from HE-processing facilities
- Waste oil/solvents - assumed to be contaminated with HE

- Scrap - any machinery, equipment, or furniture used in HE-processing areas is considered potentially contaminated with HE and is not allowed to leave the area until any HE has been removed.

Administrative controls within ESA and DX Divisions ensure that the chemical composition of every HE developed or routinely used at LANL is known. In addition, the compatibility of each HE with other HE compounds and with other materials with which it may come in contact is determined by LANL's Explosives Technology and Safety Group (DX-16) and ESA-WMA before the HE is routinely used at LANL through sensitivity testing and design of HE.

The packaging and collection of waste material for disposal at the TA-16 burning ground is defined by established procedures; current practice is discussed in the following paragraphs. Waste HE and HE-contaminated materials are packaged by the generator in containers which are clearly identified. Permanent receptacles, such as dempster dumpsters, drums, garbage cans, and disposal cans must have the contents for which they are intended stenciled on their sides. Cardboard boxes containing scrap HE must have a completed explosives record card (Form WX-3-41) attached to the outside of the box. All receptacles containing wastes regulated by the Resource Conservation and Recovery Act (RCRA) must have the words "Hazardous Waste" posted on the outside and must be stored in less-than-90-day storage areas.

Pressed and cast HE is placed in separate boxes. A reinforcing piece of cardboard is placed in the bottom of cardboard boxes containing HE waste. If more than one large piece of waste HE is placed in a box, a cushioning material, such as Kimpak®, must be placed between the pieces so that contact cannot occur during transport. All boxes are closed and the lids taped securely shut. Pieces of HE that weigh more than 50 lbs are placed in a suitably-sized HE transportation container with a lid that can be securely closed. HE with boosters or metal attachments must be labeled and packaged separately from other explosives.

HE-contaminated liquids are packaged as follows:

- Flammable solvents, including toluene, acetone, methyl ethyl ketone, and alcohol (see Attachment 4-1), are poured into red disposal cans, plastic containers, or 55-gallon drums stenciled "FLAMMABLE." The cans and drums are grounded.
- Dimethylsulfoxide (DMSO) is poured into disposal cans stenciled "DMSO only."
- Used oil drained from explosive processing equipment is stored in disposal cans or 55-gallon drums marked "Hold for Disposal." ESA-WMA maintenance personnel identify each container, or group of containers if the material has a common source, with an identification number and record of the source, fluid type, and date of removal. These fluids are burned at the oil/solvent burn tray. Drained hydraulic fluid from non-HE

processing equipment is not laboratory analyzed for HE but is handled by LANL's Environmental Systems and Waste Characterization Group (CST-7) after being certified free of HE by an Authorized Certifying Agent using the HE spot test.

The procedure for collecting HE-contaminated sludge from sumps associated with development and fabrication units is briefly summarized here. All pieces of HE retained in the small wire basket located at the sump inlet are placed in paper or plastic bags and then packaged in cardboard boxes. The flexible hose from the ESA-WMA vacuum truck is inserted into the HE slurry at the bottom of the tank. Up to 500 gallons of slurry and waste water can be collected. After completion of the sump cleaning operations, the truck is driven to the filter vessels at the burning ground where the water/HE slurry is treated.

Prior to burn operations, the gate on the access road is closed by the HE disposal crew. The closest property, not owned by LANL, is at a distance greater than one mile from the burning ground. Operations are not conducted at the burning ground if an electrical storm is in progress or is approaching. No more than two persons are involved in setting the ignition train and squibs in preparation for a burn. The master controls for the firing circuit are located inside a control shelter. The control shelter is no less than 300 ft from all burn operations. Personnel engaged in explosives disposal activities are thoroughly trained in the hazards associated with handling, transporting, and disposing of explosives, and in the precautions necessary for personnel protection. All personnel are instructed in and are expected to follow the applicable ESA-WMA procedures when at TA-16. Operators engaged in disposal operations at the burning ground wear flameproof coveralls, industrial safety shoes, and appropriate eye protection.

All open burn operations are conducted in accordance with appropriate standard operating procedures (SOP), ESA-WMA SOP group 12.0. Adherence to the SOPs ensures safe and efficient HE destruction and decontamination of flashed materials. Efficient decontamination is also expected to result in minimization of products of incomplete combustion (i.e., carbon monoxide [CO], volatile organic compounds [VOC], and hazardous air pollutants [HAP]).

All records, including plans, required under 20 NMAC 4.1, Subpart V, 264, Subpart E will be furnished upon request and made available at all reasonable times for inspection by duly designated representatives of the New Mexico Environment Department (NMED) and the EPA. To satisfy the requirements of 20 NMAC 4.1, Subpart V, 264.74(c), a copy of records of waste disposal locations and quantities, as required by 20 NMAC 4.1, Subpart V, 264.73(b)(2), will be

submitted to NMED and the local land authority upon closure of the facility. Shipments to off-site facilities will comply with the requirements of 20 NMAC 4.1, Subpart III.

4.2.1 Off-Normal Waste Generation

The Material Disposal Area P (MDA-P), adjacent to the burning ground at TA-16, is scheduled for closure. The TA-16 open burn units may be used for destroying any HE on contaminated debris from remediation and closure of the MDA-P. The MDA-P contains an estimated 30,000 cubic yards (yd^3) of waste and debris. Waste that may be generated during closure of the MDA-P includes personal protective clothing (approximately 150 yd^3), disposable sampling equipment (approximately 160 yd^3), liquids and sludges from decontamination (approximately 22,000 gallons), debris, and soil/tuff (approximately 60,000 yd^3) from the waste pile. The waste will be treated or disposed of within 90 days of excavation. The estimated date when waste will be ready for disposal is Fall 1995. A closure plan has been submitted to NMED for MDA-P. Estimated waste types are included in the TA-16 Part A permit application included as Attachment 1-1 of Section 1.0 of this permit application.

The Environmental Restoration Program is conducting clean-up of TA-9, -11, -16, -28, and -37. The materials potentially sent from these operations would include approximately 4 55-gallon drums of personal protective equipment, 1000 yd^3 of soil and debris per year, 4 55-gallon liquid (wash water), and 3 liters of spent acetone. Only those hazardous wastes included in routine operations (see the TA-16 Part A permit application) would be burned or flashed at the burn ground.

4.3 TA-16-387 FLASH PAD TREATMENT OPERATIONS

Flashing operations are conducted to remove HE contamination from unburnable materials. In addition, spent carbon filters that may contain listed solvents from the waste water treatment unit and washwater from mopping may be flashed. The carbon itself is not consumed but is then taken to TA-54 and managed as a RCRA listed hazardous waste. Any materials that are potentially contaminated with HE must be flashed prior to disposal because of safety concerns. Treatment personnel deliver potentially HE-contaminated, unburnable materials to the burning ground where they are inspected for reservoirs of oils, other fluids, and excessive deposits of explosives, which are removed before flashing. Valves on any sealed containers are opened or removed. Historically, kindling wood or scrap lumber has been placed on the bottom of the flash pad. The flash pad is constructed of concrete blocks lined with sand. The burns consist of approximately 800 to 1,600 lbs of wood pallets or scrap lumber placed on the bottom grill of the burning ground stand or on and around the flash pile. The amount of wood used is determined

by the type and quantity of materials to be flashed, but is always sufficient to ensure that the flashing is complete and no HE contamination remains. Each burn requires approximately one-half gallon of kerosene and excelsior to ignite the wood. In addition, when available, 20 to 50 lbs of HE-contaminated rags, paper, cardboard, plastics, packing material, and combustible firing site debris are mixed with the wood to aid in ignition and act as a combustion source. The amount of unburnable material flashed in each burn is approximately one-and-a-half tons and consists primarily of metal and glass (e.g., machine tools, vacuum piping and pumps, glass containers, filters). An ignition train is prepared with a one-to-two ft train of excelsior up to the material on the pad. The excelsior is dampened with kerosene. Squibs are placed approximately one inch from the excelsior and ignition is initiated according to the steps outlined in current ESA-WMA procedures. After completion of the burn, ash from fuel wood and other burnable fuels (e.g., rags, paper) is collected and analyzed. If barium is found, it is sent to TA-54 as hazardous waste. If barium is not found, it is sent as a nonregulated waste.

A proposed alternative to wood fuel is the use of propane burners to flash suspect HE-contaminated waste. This alternative will reduce the amount of air and land disposal emissions from the operation and, if implemented, will be used for the majority of burns at the flash pad. The wood fuel option will be maintained as a backup. Aerial combustion emissions will be reduced by using propane as the fuel rather than scrap wood (see Attachment 4-1). Depending on the amount of material to be flashed, from one-to-three portable burners would be placed in front of the flash pad at a distance of 2 to 6 ft. Each burner would have an adjustable heat output in the range or 1,000,000 to 1,800,000 British Thermal Units (BTU) per hour (hr) and have a flame length of 8 to 12 ft. It is estimated that 1,000,000 BTU/ton (11 lbs of liquid propane per ton of equipment flashed) would be required to heat up and maintain the equipment at a temperature of 800 to 1,000 degrees Fahrenheit (°F) to ensure destruction of all known and potential HE contamination (Figures 4-4 to 4-5). DX-16 has designated that 665°F is the minimum temperature at which all explosives used in DX and ESA operations will be thermally decomposed. Several thermocouples will be placed on and within the equipment being flashed to record temperatures and to document that the materials reached and maintained the required temperature levels for the necessary time. Recorded temperature data and an additional HE screening test clean certification will allow flashed materials to be designated as nonHE-contaminated and available for commercial salvage, when appropriate. In addition, the use of propane burners would minimize the generation of ash requiring disposal.

A minimum of 24 hours must lapse after burning (if wood is used) before ashes and other nonburnable equipment can be collected. Wood-flashed material is disposed of as

administratively-controlled, nonhazardous waste; propane-flashed material will be commercially salvaged. Approximately 30,000 yd^3 of waste material will be flashed at the TA-16-387 pad annually.

4.4 TA-16-388 AND -399 BURN PADS

When HE materials are delivered to the burning ground, the delivery truck is backed up to the entrance of the burn pad to be used (Figure 4-6) and boxed explosives are unloaded and left inside the pad fence. The truck is driven outside the burning ground and the motor is turned off. The burn pads consists of elevated metal trays lined with fire brick and sand (see Figure 4-6). A layer of 15-lb asphalt felt or roofing paper is placed over the sand in the elevated burn pad and HE material is removed from boxes and placed on the felt in a single layer. After the containers have been emptied, they are placed beside or on top of the HE for burning, or are returned to the truck. Any unidentified material or material that should not be burned (e.g., detonators) is removed from the felt and repackaged. An ignition train is prepared and ignited as described above. No more than 1,000 lbs of HE may be burned at one time. After 24 hours, ashes and surface sand are removed from the tray and placed in a 55-gallon drum. The drum is managed by CST-7 as a hazardous waste if the ash is found to contain toxic concentrations of barium. Approximately 10,000 lbs of material will be burned annually.

4.5 TA-16-394 BURN TRAY TREATMENT OPERATIONS

LANL is permitted under New Mexico Air Quality Control Regulation (AQCR) 301 to burn up to 2,500 gallons of dilute solvents per year in specialized solvent trays at the TA-16 burn grounds. Up to 50 gallons per burn are allowed under the conditions of the permit. An average make-up of the dilute solvent solution is 30% methanol, 25% water, 20% acetonitrile, 20% tetrahydrofuran, 5% of any of the solvents listed in the TA-16 Part A permit application (Section 1.0, Attachment 1-1), and trace amounts of HE. Occasionally oil contaminated with HE will be burned. Potential emissions were estimated using data from "Prediction of Fire Properties of Fuels" (Tewarson, 1985). Potential emissions from solvent burning are shown in Table 1 of Attachment 4-1.

The oil/solvent burn trays (Figure 4-7) are currently used to flash suspect HE-contaminated oils and solvents in accordance with an air quality burn permit (AQCR 301) issued by NMED. Each burn consists of pouring approximately 50 gallons of HE-contaminated oils and solvents into burn trays and igniting the mixture. The burn trays consist of two 8-inch thick welded steel trays elevated in a concrete secondary containment vessel. The secondary containment vessel contains a layer of gravel and sand and is lined with fire bricks (see Figure 4-7). The flammable

solvents include toluene, acetone, alcohol, methyl ethyl ketone, and other HE-contaminated liquids resulting from HE analysis and processing. Used HE-contaminated hydraulic fluids mixed with solvents are drained from explosive processing and machining equipment and burned. The total percentage of the HE in the solvent/fluids mixture is unknown, as is the percentage of solvents.

In addition to standard apparel, respirators must be worn when volatile solvents will be treated during a burn. Face shields or other suitable eye protection are worn while liquid is discharged and during cleanup operations when airborne particles constitute an eye hazard. HE-contaminated waste oils/solvents are collected in containers and delivered to the liquid burn pad. Small (e.g., 5-gallon) containers are unloaded by hand; the truck boom may be used to unload larger (e.g., 55-gallon) containers from the vehicle. After unloading, the truck is driven outside the burning ground and parked. HE-contaminated liquids are poured into the burn trays by hand if in small containers, or using a plastic plug, valve, and hose to empty large containers. A grounding strap is attached to the container and the tray before liquid transfer. Equipment used to load the trays must be thoroughly cleaned before being stored at the burning ground. Historically, excelsior and squibs are used to initiate ignition as described above.

Propane burners (Figures 4-8 and 4-9) have been proposed as an alternative to excelsior and squibs. As part of this alternate procedure, the burn tray size would be reduced to 75 gallons from its current gallon size. The propane burners can provide a more efficient method of destroying solvent/water mixtures and reducing air emissions. An adjustable 50,000 to 200,000 BTU/hr propane burner will be placed under the 75-gallon tray to vaporize the HE-contaminated mixtures. Two 25,000 to 50,000 BTU/hr propane burners will be placed over the tray to ignite solvent vapors. Water in the water-solvent mixture (ranging from 0 to 95%) would be boiled off in the process. The heat that will be supplied to the tray by the propane burners will be approximately 1.1 lb of liquid propane (or 100,000 BTU) per 50-gallon burn. The 100,000 BTU would be used to boil/flash any 50-gallon solvent/water mixture (95% water or 100% solvent). Approximately 700 gallons of HE-contaminated solvent/water mixtures will be boiled/flashed annually. Retention of the historical burning method is requested as a back-up should necessary situations apply.

Little or no ash is generated in the burn trays. Residues from the burning of listed hazardous wastes in the burn trays are managed as a hazardous waste by CST-7.

4.6 TA-16-401 AND -406 FILTER VESSELS TREATMENT OPERATIONS

HE-contaminated sludge is delivered to the filter vessel (Figure 4-10) in a vacuum truck. The filter vessel is constructed of welded steel and lined with fire bricks. The end of the discharge hose is placed into the filter vessel, the valve on the bottom of the tank is opened, and the slurry is gravity-fed into the filter vessel. Liquid passes through the sand/gravel filter bed into a fluid drain at the base of the filter vessel and through carbon adsorption units at the wastewater treatment unit located near the filter vessels. Treated effluent is discharged to the nearby canyon through a National Pollutant Discharge Elimination System (NPDES)-regulated discharge point after laboratory analysis to ensure NPDES permit compliance. After the slurry is drained from the tank, the inside of the tank and the discharge hose are washed with water that filters to the wastewater treatment unit. Rags or Kimwipes® are used to clean explosives off the inspection port cover, and these are placed in the filter vessel for treatment. Waste chunks collected from the wire cage in the sump are added to the sludge. When the filter is full, the wet waste is distributed to a uniform thickness, not to exceed three inches (maximum 750 lbs), with a spark-proof rake. A cover is then positioned on the filter vessel and secured, and hot air is blown into the filter vessel. When the waste sludge is dry, the filter vessel cover is removed and the sludge is ignited remotely with excelsior and squibs as described above. Ashes and a small amount of sand are removed from the filter vessel when the burn is complete. These are drummed and managed by CST-7 as a hazardous waste if toxic levels of barium are detected by analyzing the reside, and/or if listed solvents have been comingled with the sand or ash in the filter vessels. Fresh sand is added to the filter vessels as necessary. Approximately 10,000 lbs of waste material will be burned annually.

4.7 EXPOSURE INFORMATION

The major migration pathways and relevant environmental media through which exposure to residual contaminants could occur include: (1) liquid or ash infiltration into near-surface or subsurface soils, (2) wind entrainment and dispersal of surface soil and atmospheric dispersion of volatiles, and (3) surface water runoff carrying soil/sediment in suspension and solution. Secondary pathways include: 1) uptake by animals from ingestion and inhalation of contaminated media, and (2) root uptake by plants from contaminated soils (LANL, 1993a).

Only solid materials composed of or potentially contaminated with HE are burned in the burn pads. Ashes and surface sand are removed and packaged after each treatment as described in Section 4.4. A movable rain cover is used to prevent precipitation from contacting material in the tray. No potential for liquid pollutant releases to the surrounding surface soil is associated with this treatment.

Liquid wastes contaminated with HE are burned in two 8-inch welded steel trays placed within a concrete containment vessel filled with sand and gravel. The secondary containment serves to contain any liquid spills and prevent liquid releases to the surrounding surface soil during treatment operations. Additionally, weekly inspections are conducted to verify the structural integrity of the trays.

Machinery or materials potentially contaminated with HE and other materials that are treated on the flash pad, are placed on removable concrete slabs for flashing. Ash on and around the pad is removed and packaged as described in Section 4.3. Cleaning the area as soon as allowable minimizes releases to the environment.

Operational procedures require that open burning not be undertaken at a time of impending electrical storms and during high wind conditions. Burns are carried out in steel vessels containing absorbent sand. The steel vessels are covered within 24 hours after treatment to prevent storm runoff. The contaminated sand and residues are subsequently collected, drummed, and managed as dictated by analytical results.

4.7.1 General (LANL Air Quality)

LANL is committed to operating within the requirements set forth in federal and state air quality statutes while maintaining the operational flexibility to respond to changing strategic initiatives. LANL is in compliance with all federal and state nonradiological ambient air quality standards. Emissions from operations at LANL will be reported annually to the State of New Mexico Environment Department's Air Pollution Control Bureau as required by the 1990 Clean Air Act Amendments and by the State of New Mexico's Operating Permit Program. Compliance with federal and state nonradiological ambient air quality standards requires that only new or modified sources measure or estimate the off-site impacts for criteria pollutants (i.e., CO, oxides of nitrogen [NOx], particulate matter [PM], and VOCs) using air monitoring sampling or dispersion model analysis.

Monitoring for criteria pollutants was performed at the boundary of Bandelier and TA-49, approximately 15,500 ft south/southeast of the TA-16 burn grounds by the National Park Service. The three year study found that criteria pollutants measured at the station were representative of that found throughout northern New Mexico. Attachment 4-1 gives supplemental air quality information.

4.7.1.1 Emissions from Operations at TA-16

The majority of airborne emissions from the operations conducted at TA-16 are made up of complete and incomplete combustion products from the burning of HE and HE-contaminated materials. A small amount of air emissions are from the evaporative losses of discarded solvents prior to burning. Open burning is allowed at TA-16 by NMED and regulated under New Mexico AQCR 301, "Regulation to Control Open Burning." AQCR 301 allows the open burning of explosive materials where the transportation of such material to other facilities could be dangerous. An open burning permit application for TA-16 is submitted to NMED annually for review and approval.

Air emission estimates are performed annually (current estimates are provided in the Supplemental Information Sheet, Attachment 4-1) for the operations described in this application. Emissions from the TA-16 operations include contaminants regulated under National or New Mexico Air Quality Standards which include ambient air quality standards for CO, NOx, PM, nonmethane hydrocarbons, and VOCs. Other regulated emissions from the operations include HAPs (i.e., hydrogen fluoride, hydrogen chloride), and air toxics (i.e., butylacetate, ethylacetate, cyclohexane). Emissions from all regulated pollutants from these operations have been estimated using general burn volumes and are in compliance with all applicable air quality standards.

4.7.1.2 Air Pathways and Off-site Impacts

The predominant exposure pathway for open burning of reactive wastes is inhalation of airborne products of complete and incomplete combustion. Estimated emissions impacts at the nearest off-site receptor, Bandelier National Monument, are determined using dispersion modeling analysis (current estimates are provided in Attachment 4-1). Modeling analysis is performed to estimate air quality impacts of stationary sources using models approved by EPA. An analysis is performed for any "modification," defined as any physical change or change in the method of operation, of a stationary source which results in an increase in the potential emission rate of any regulated air contaminant emitted by the source or which results in the emission of any regulated air contaminant not previously emitted. This analysis, when performed, is available to NMED upon request.

4.7.2 Surface Water Pathways

LANL operates under an NPDES general storm water permit (NMR00A384) and under an NPDES outfall permit (NM0028355). In accordance with this permit, a Storm Water Pollution Prevention Plan (LANL, 1994c) was developed for TA-16. All open burn structures at TA-16 will

have a weather cover to prevent entrance of rainwater as of September 1995. Potential nonstorm water discharges include: water discharge from water hoses located at each burn pad for fire control purposes; accidental spills or leakage from vessels containing HE-contaminated oil, HE-contaminated water, or HE-contaminated water/solvent mixtures; and accidental leakage or spills from the tank truck that transports HE wastewater from HE-processing facilities to the TA-16 burn ground.

Pollutant sources from TA-16 burn ground operations include a minimal amount of ash residue from the TA-16-387 flash pad. Ash as a pollutant source is minimized because most of the residue is removed from the flash pad immediately following a burn and packaged and shipped in drums. Ash left on the flash pad is listed as a pollutant source under the NPDES permits. A rainwater cover, which will be installed in September 1995, will eliminate this source. Storm water is prevented from contacting the HE-contaminated equipment waiting to be flashed by covering the equipment with plastic. Flashed equipment is transported to TA-54 and buried as a nonhazardous material.

Storm water run-off that could have come in contact with adjacent areas of MDA-P has been diverted in a major construction task that was completed in 1994. This task included: 1) blocking off the existing 36-inch culvert under the paved entrance to the TA-16-387 burn pad, and installing a new 24-inch culvert under the main roadway to the south side of the roadway, which will divert storm water run-off from north of the roadway away from MDA-P, (2) excavating a deep drainage channel to allow existing drainages to enter the channel and include a wide apron area to collect run-off, and between TA-16-386 and TA-16-387 to collect water and divert it into the drainage channel, (3) filling and compacting the existing trench between the barbed-wire fence and MDA-P using nonabsorbing/nonpermeating packed material that will not allow water to seep into MDA-P, and (4) constructing a diversion berm in the drainage north of the new drainage channel exiting the TA-16-387 burn pad.

When oil is burned in the burn trays, the covers are removed and the oil is ignited. While burning, small amounts of oil may bubble out of the tray into the rock-filled concrete containment vessel. Oil splash-over from these operations is exposed to storm water. This splash-over is not identified as a pollutant source because the concrete containment vessel contains the oil/storm water mixtures and is equipped with a drain pipe valve to remove liquid. The drain pipe remains capped until collection is necessary. When collected, the oil/storm water is placed into the burn tray for treatment. The burn trays are elevated to prevent storm water run-on.

The burn pads that are currently in use for HE disposal have rain covers and are elevated, to prevent pollutant release by storm water. If fire control hoses are used, there is a chance that the water used for fire control will spread ash residue pollutants beyond the confines of the pad. In this case, the ash pollutant could be dispersed by storm water. The majority of this water would be diverted to collection areas and culverts.

Small amounts (i.e., less than two gallons) of residual oil from hydraulic equipment have leaked from some of the equipment onto the ground near the TA-16-387 flash pad and are listed as a pollutant source under the NPDES permits. A containment berm around the stored equipment has been installed, and this equipment is currently covered with a tarp (LANL, 1994c).

Water quality data collected downstream from TA-16 over the past 30 years has generally shown that contaminant abundances are below levels of concern (EPA, NMED, and Department of Energy standards) for barium and other metals. Soil and storm water sampling will be conducted for constituents of concern (i.e., HE, metals, VOCs, and SVOCs) at TA-16 in fiscal year 1995. Attachment 4-2 provides additional hydrological information and presents a conservative scenario to evaluate possible waterborne waste transport pathways and their potential for containment migration.

4.7.3 Groundwater Pathways

The vadose zone of the Bandelier Tuff is not saturated, except in very shallow and localized areas. The low moisture content and extensive thickness of the unsaturated rock is believed to impede movement of fluids down to the main aquifer. The main aquifer is primarily located in the Santa Fe Group and Puye Formation at depths of several hundred to greater than 1,000 ft below the mesa tops. The annual precipitation in this area varies between 13 and 18 inches. The evaporation of free standing water is much greater than the annual precipitation.

Because of the high annual evaporation rate (i.e., greater than or equal to 2 ft per year), the great depth to the main aquifer (i.e., greater than 1,000 ft), and the nature of the geology of the area, the groundwater pathway is unlikely to be an important transport pathway at TA-16 (LANL, 1993a). A groundwater waiver has been requested (DOE, 1987) based on the absence of free-flowing groundwater within the uppermost 200 ft beneath the units, and on the hydrologic conditions in this upper zone, which indicate no migration of contaminants to groundwater.

An extensive groundwater monitoring system established to assess water quality and detect contaminates in the water supply exits as part of LANL's groundwater protection activities. The

monitoring system is maintained to detect any effects that Laboratory activities may have on the main aquifer. Further details can be obtained in LANL's "Groundwater Protection Management Program Plan" (LANL, 1995).

Attachment 4-2 provides additional hydrological information and presents a conservative scenario to evaluate possible waterborne waste transport pathways and their potential for containment migration.

4.7.4 Foodchain Contamination

As part of its Foodstuffs Monitoring Program, LANL annually monitors foodstuffs (e.g., produce, fish, bees, honey) from various locations within LANL boundaries and from numerous perimeter and regional locations. The regional sampling locations are chosen to provide "background" data from areas that are not affected by LANL activities. Sampled foodstuffs are analyzed by LANL's Inorganic Trace Analysis Group (CST-9) for various heavy metals. The concentrations of trace heavy metals in each of the foodstuff media sampled were generally within expected ranges. Therefore, the potential for human exposure via foodchain contamination is very unlikely.

4.7.5 Description of SWMUs

The units addressed in this permit application are also designated as the following solid waste management units (SWMU):

SWMU	STRUCTURE	UNIT DESCRIPTION
16-010(b)	TA-16-387	FLASH PAD
16-010(c)	TA-16-388	BURN PAD
16-010(d)	TA-16-399	BURN PAD
16-010(e)	TA-16-401	FILTER VESSEL
16-010(f)	TA-16-406	FILTER VESSEL
16-010(j)	TA-16-394	BURN TRAY
16-012(a2)	TA-16-88	CONTAINER STORAGE

SWMUs 16-010(b, c, d, e, f, and j) were recommended for deferred action until closure because they are inspected routinely and any releases are dealt with immediately (LANL, 1993a). A detailed description of the SWMUs in the vicinity of TA-16 is provided in Section 10.1 of this permit application.

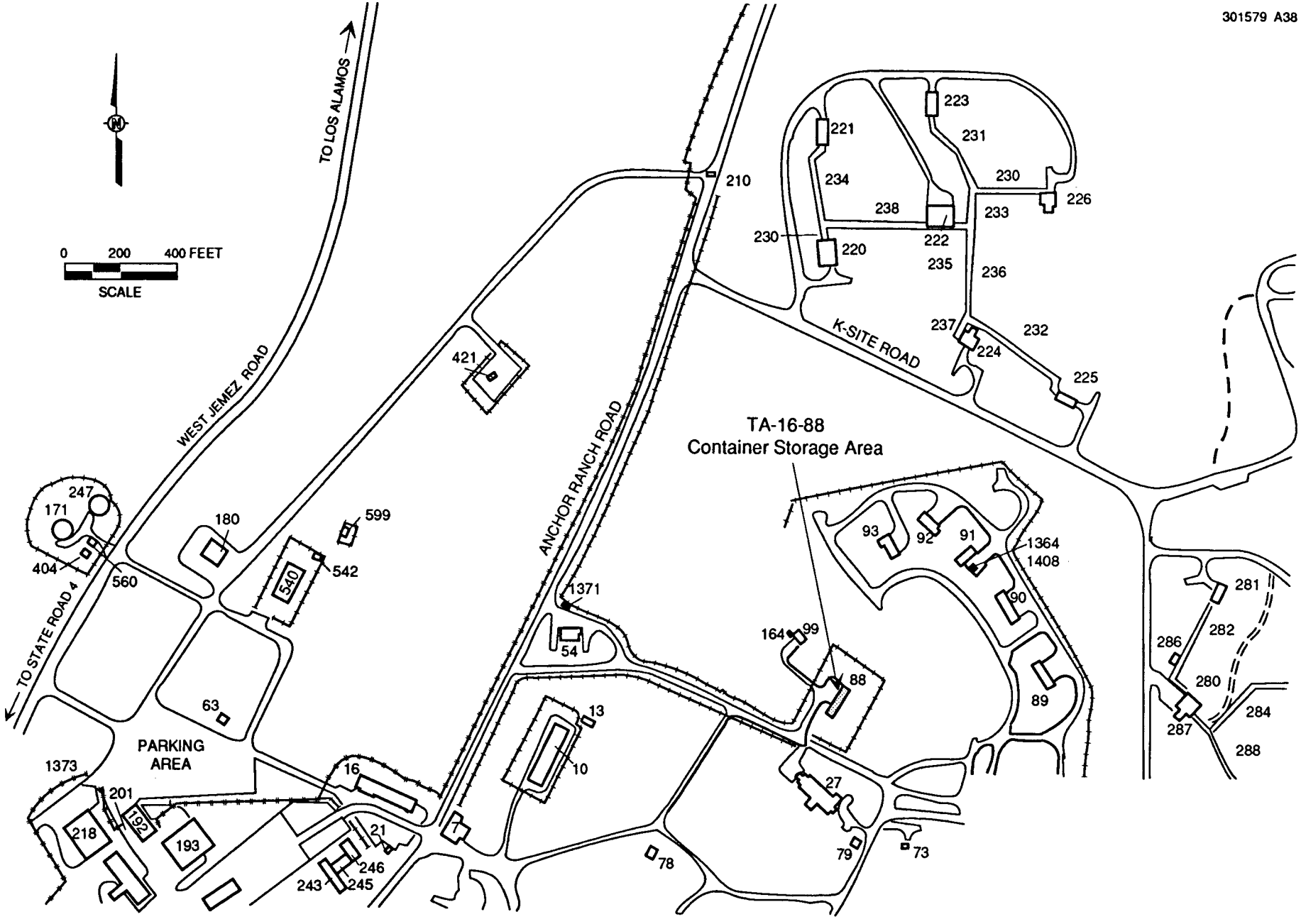
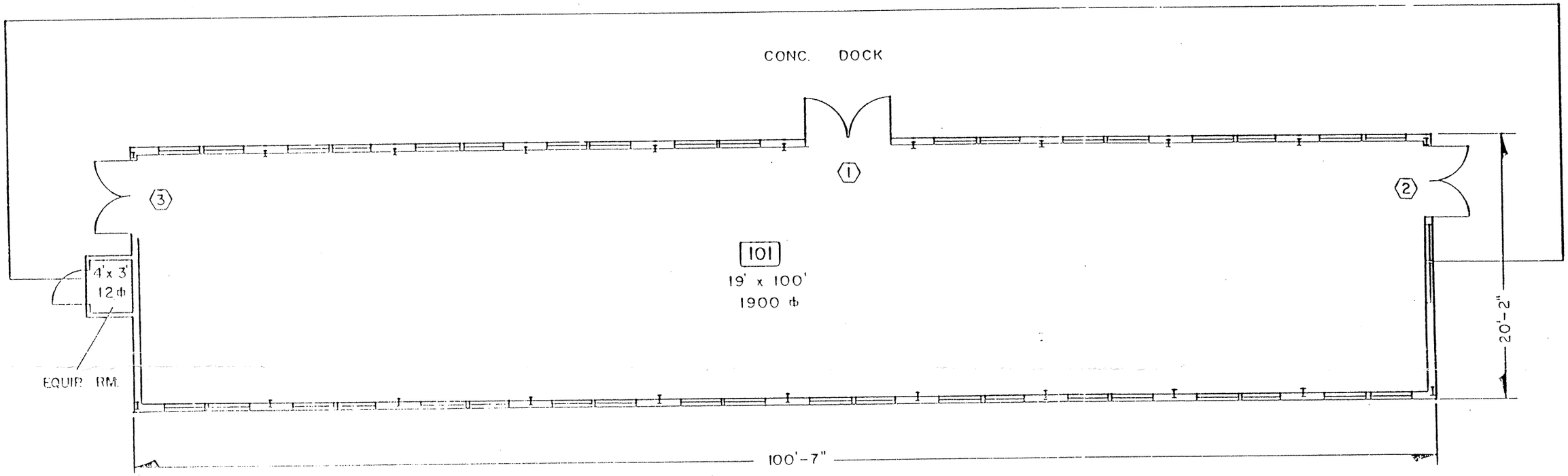


Figure 4-1
Site Location Plan for Technical Area (TA) 16, Building 88

NO	DATE	REVISIONS	BY	CHKD	GRP LDR	ENG D.O.
1	8-30-65	REVISED TO STATUS OF 8-10-65	MFM			



ED HYDE
NEW MEXICO
10404
REGISTERED PROFESSIONAL ENGINEER

(1/8"=1'-0") 0' 5' 10' 20'
GRAPHIC SCALE

TOTAL SQ. FT. 1912

Figure 4-2

Floor Plan for Technical Area (TA) 16, Building 88

FACILITIES ENGINEERING DIVISION

FLOOR PLAN

BLDG. 88 TA-16

SEC. CLASSIFICATION	
CLASS.	U
REVIEWER	[illegible]
DATE	4.29.83

SUBMITTED	RECOMMENDED	APPROVED
E. Trujillo	Dennis Rapp	Ernest [illegible]
DRAWN RAGSDALE	DATE 7-17-64	SHEET 1 OF 1
CHECKED Humble H4N		DRAWING NO. ENG-R2764

K+E ALBANENE TRACING PAPER LA 0805

REC'D ____ LOGGED ✓ TO VAULT 11-22-83

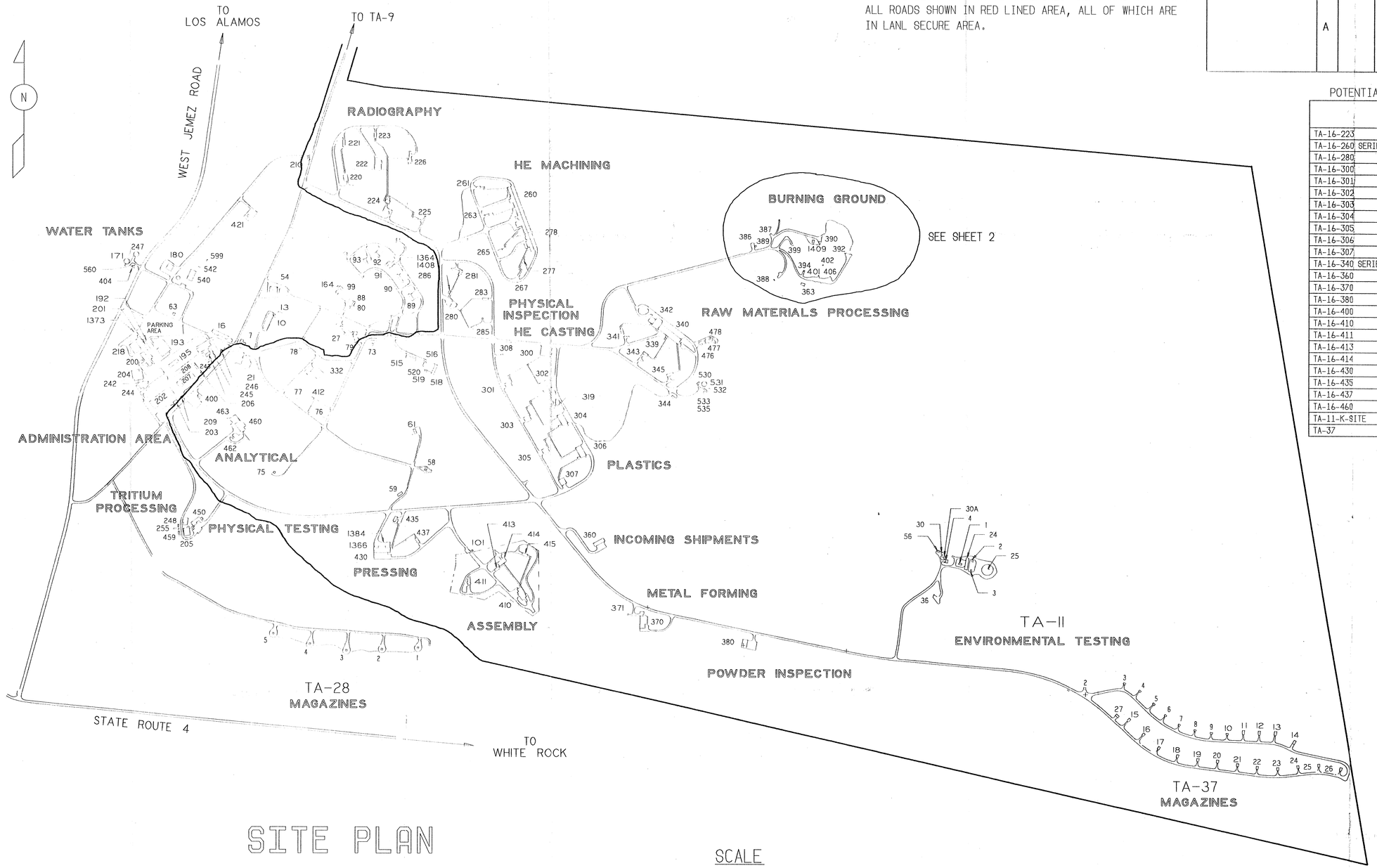
5973-F

NOTE: NO HE CONTAMINATED WASTE MATERIALS ARE TRANSPORTED ON PUBLIC ROADS SHOWN ON THIS MAP (STATE ROUTE 4 AND WEST JEMEZ ROAD.) WASTE MATERIALS ARE TRANSPORTED OVER ALL ROADS SHOWN IN RED LINED AREA, ALL OF WHICH ARE IN LANL SECURE AREA.

PART OR CONTROL NUMBER	REVISIONS		
	ISS	CLASS REVIEW	DESCRIPTION
	A		DRAWN BY - H. KORHONEN 4-5-95 CHECKER - E. HYDE ENGINEER - E. HYDE APPROVED - 1. ORIGINAL ISSUE

POTENTIAL SOURCES OF WASTES TREATED AT TA-16-BURN GROUND

	SCRAP HE	HE CONTAM SOLVENTS	HE CONTAM METAL MATL	HE CONTAM OIL	INCINERATOR TRASH	HE WASTEWATER FROM SUMPS	INERT MATL
TA-16-223	X		X		X		X
TA-16-260 SERIES	X	X	X	X	X	X	
TA-16-280			X		X	X	
TA-16-300			X		X	X	X
TA-16-301			X		X	X	
TA-16-302	X		X	X	X	X	
TA-16-303			X		X	X	
TA-16-304			X		X	X	
TA-16-305					X	X	
TA-16-306					X	X	
TA-16-307					X	X	
TA-16-340 SERIES	X	X	X	X	X	X	
TA-16-360			X		X	X	
TA-16-370					X		
TA-16-380					X	X	
TA-16-400			X	X		X	
TA-16-410	X		X		X	X	X
TA-16-411					X		
TA-16-413	X		X				X
TA-16-414			X		X		
TA-16-430	X		X	X	X	X	X
TA-16-435	X					X	
TA-16-437					X	X	
TA-16-460					X		
TA-11-K-SITE	X		X		X		X
TA-37	X				X	X	X



SITE PLAN
TA-11, 16, 28, 37

SCALE

250' 1000'
0 500' 1500'

5973-G

Figure 4-3

Technical Area (TA) 16 Burn Ground Site Plan and Areas of Waste Collection

PART CODE		
SHEET 1	TITLE	(UNC) TITLE CLASSIFICATION
ISSUE A	SITE PLAN TA-11, 16, 28, AND 37	
PART CLASSIFICATION UNCLASSIFIED		
ENGLISH	DRAWING CLASSIFICATION UNCLASSIFIED	SIZE D / DRAWING NUMBER 13Y-192374
THIRD ANGLE PROJECTION	CAGE 88516	SCALE N/A / SHEET 1 OF 2
STATUS RELEASED	ORIGIN LA-BRAVO-V4.0	

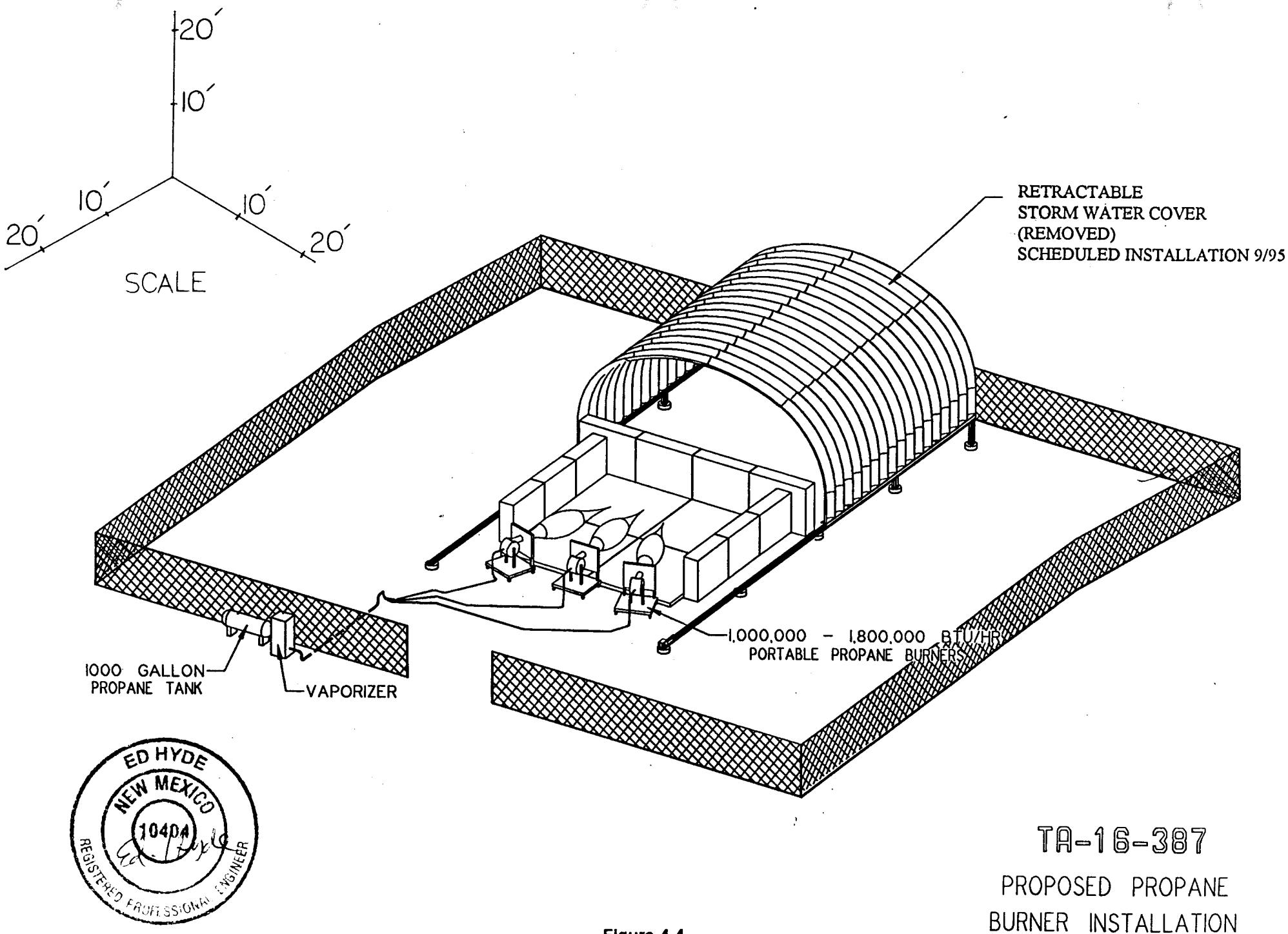
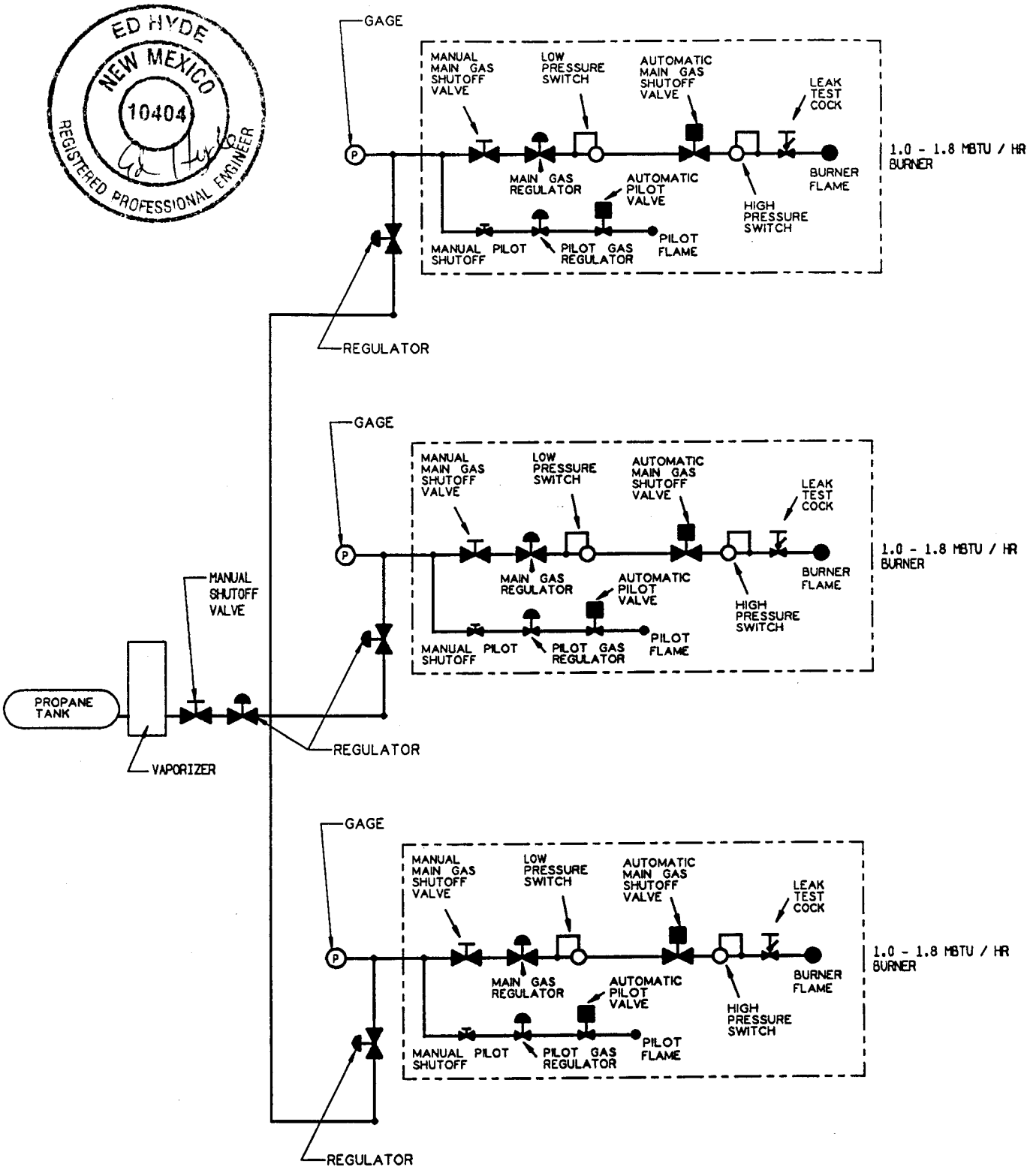


Figure 4-4

Schematic and Proposed Modifications to TA-16-387 Flash Pad



387 FLASH PAD BURNER
PROPANE PIPING

Figure 4-5

Drawing of Proposed Modifications to TA-16-387 Flash Pad

NOTE:
THE BURN TRAY IS METAL & LINED WITH FIRE BRICK

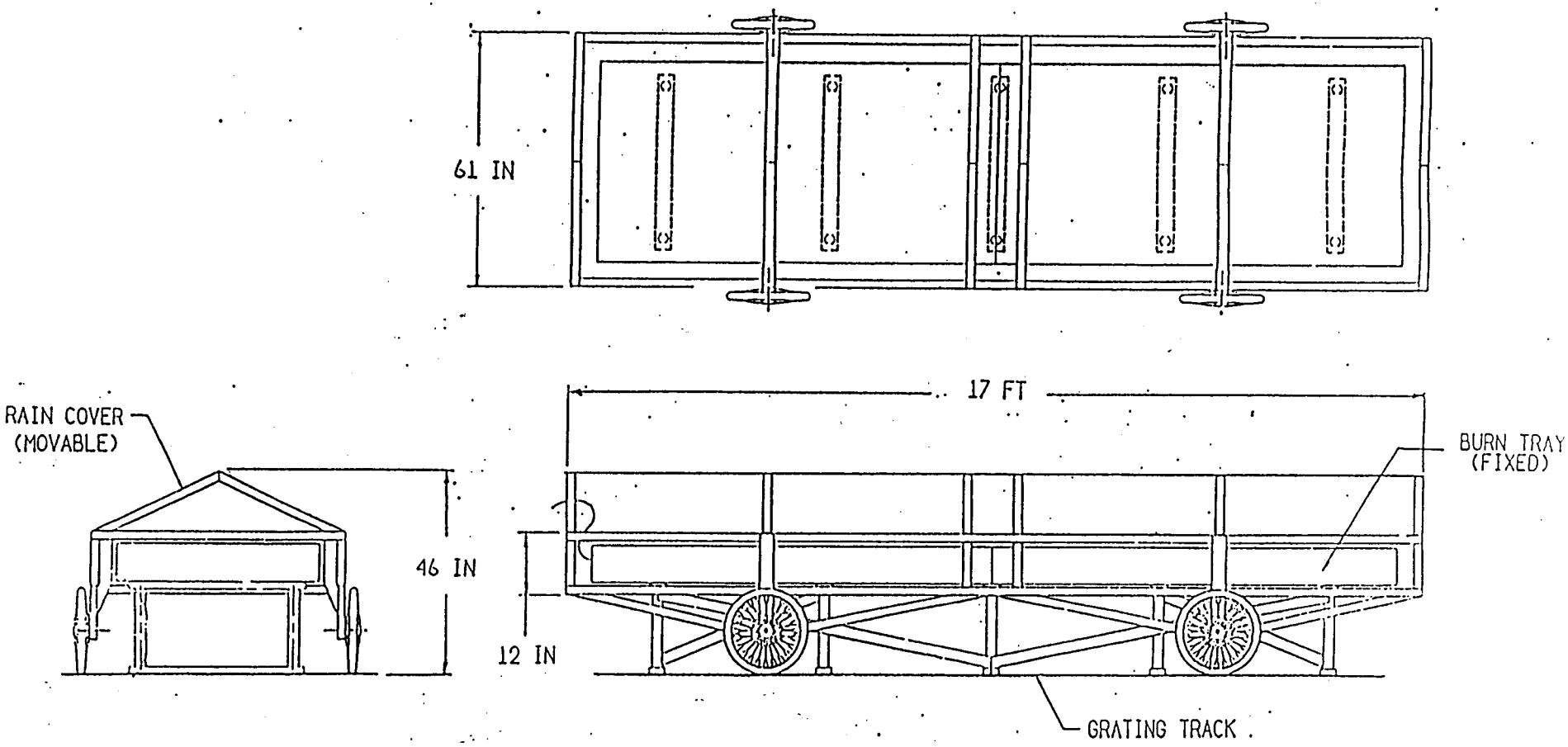
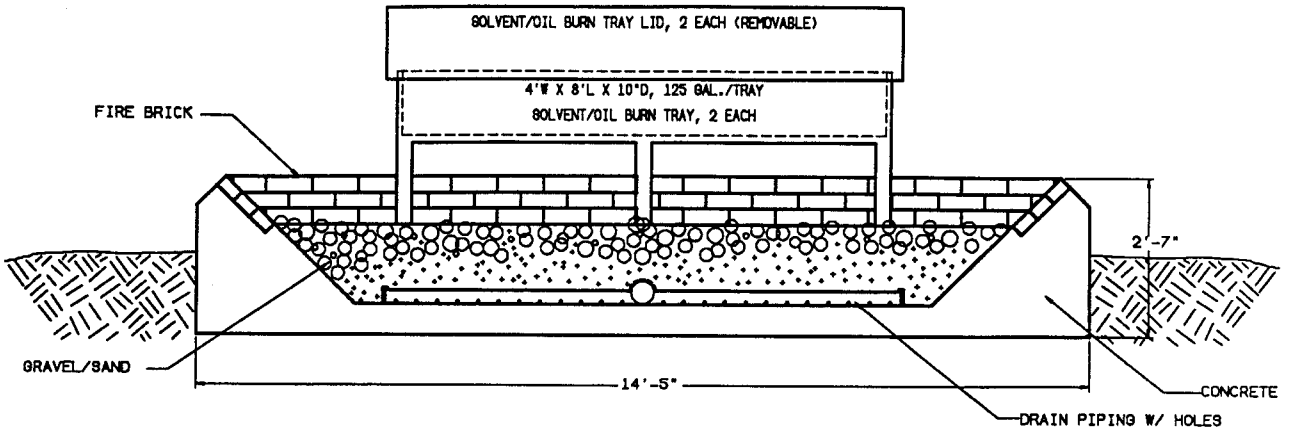
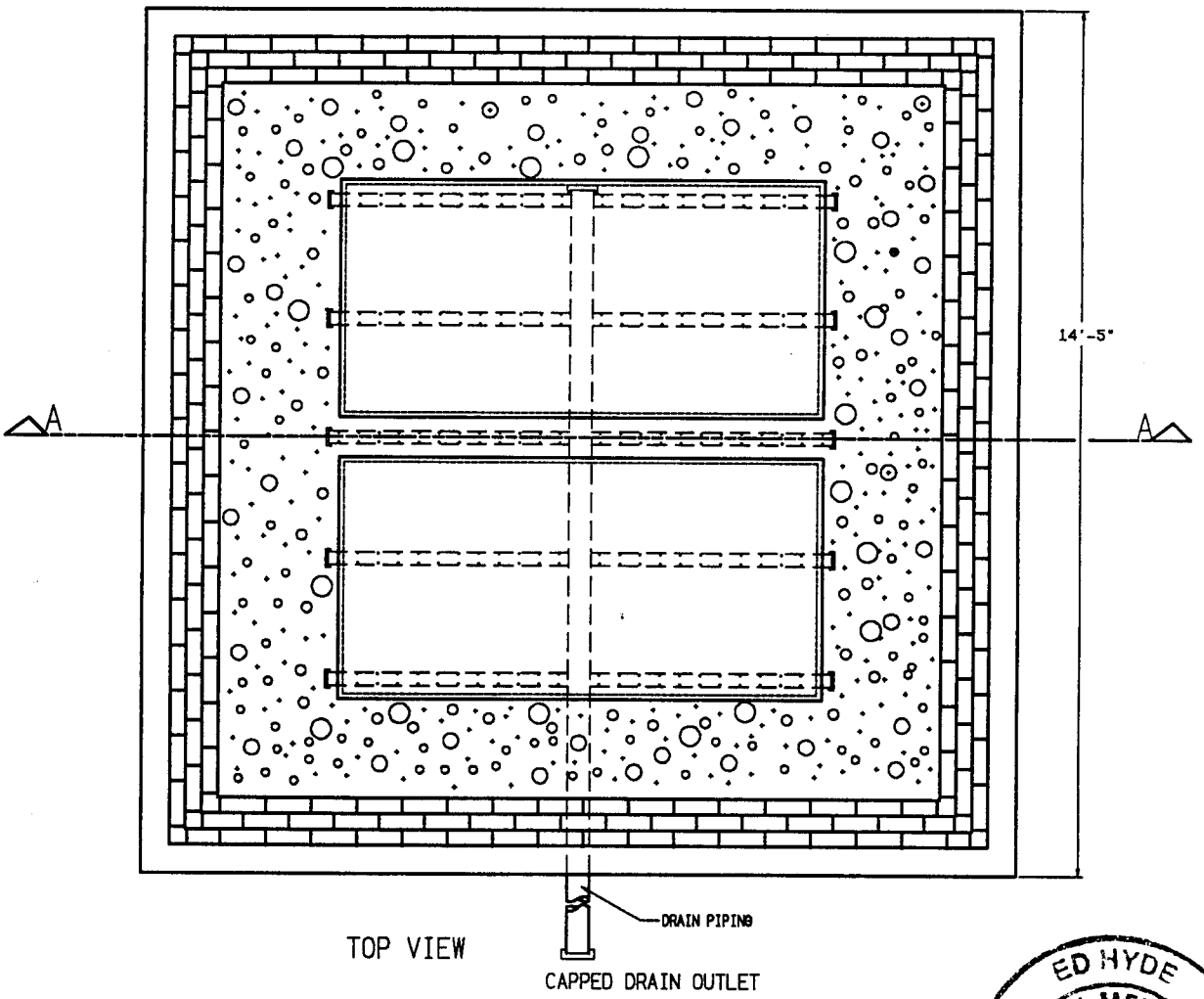


Figure 4-6

Schematic of TA-16-388 and TA-16-399 Burn Pads



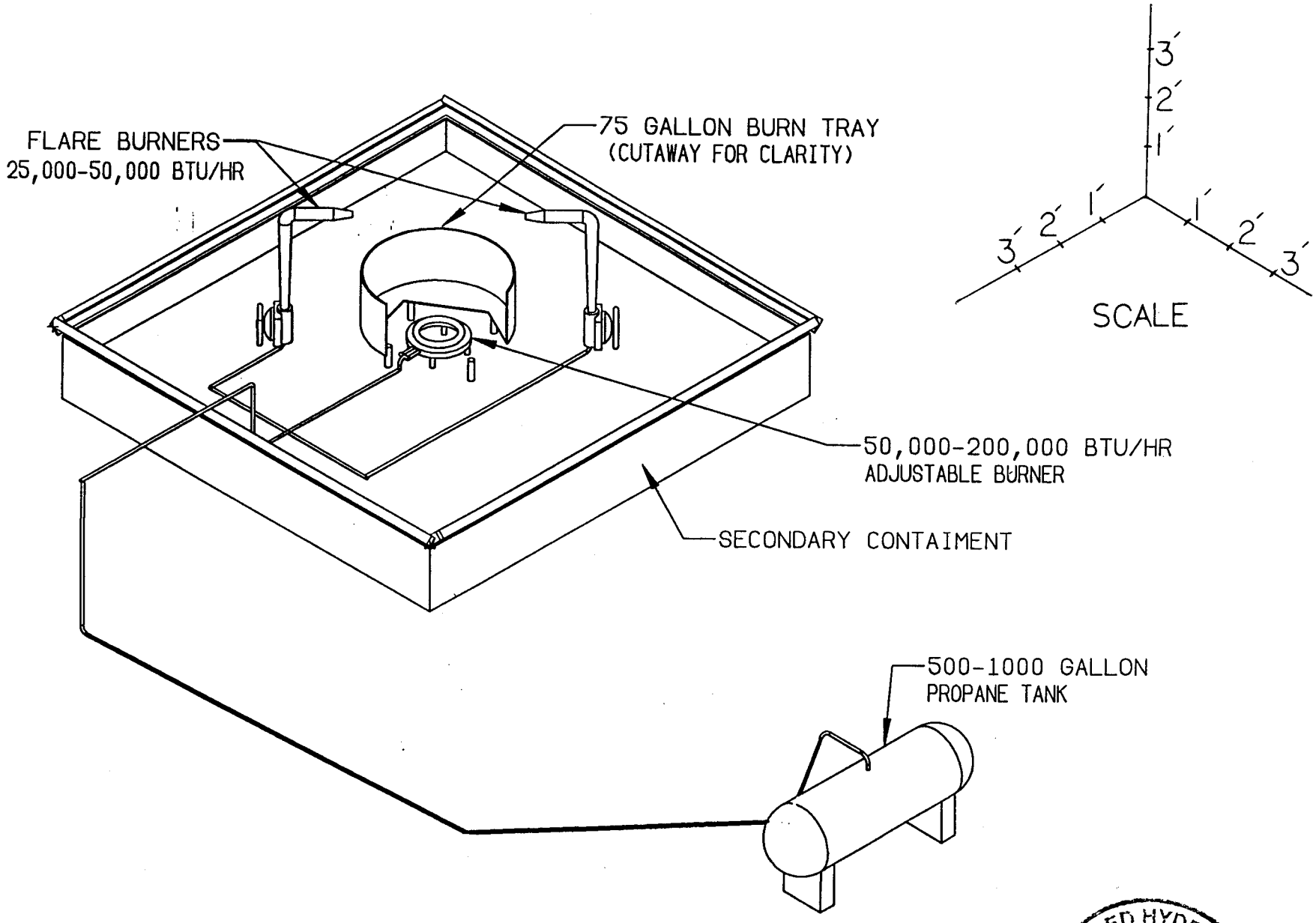
SECTION A-A VIEW



TOP VIEW

Figure 4-7

Schematic of TA-16-394 Burn Tray

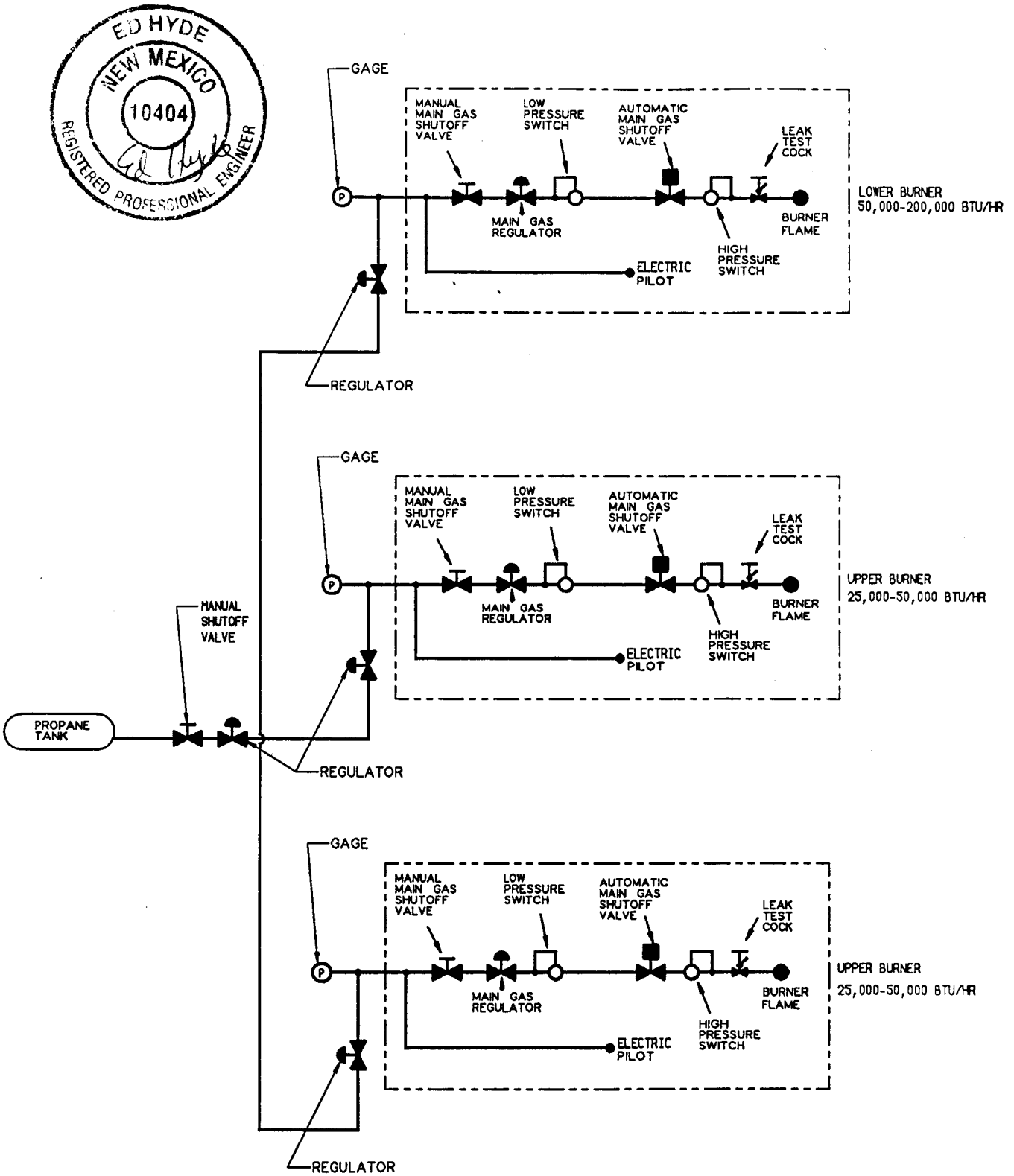


TA-16-394 BURN TRAY
PROPANE BURNER INSTALLATION

ED HYDE
NEW MEXICO
10404
REGISTERED PROFESSIONAL ENGINEER

Figure 4-8

Drawing of Proposed Modifications to TA-16-394 Burn Tray



394 BURN TRAY
PROPANE PIPING

Figure 4-9

Drawing of Proposed Modifications to TA-16-394 Burn Tray

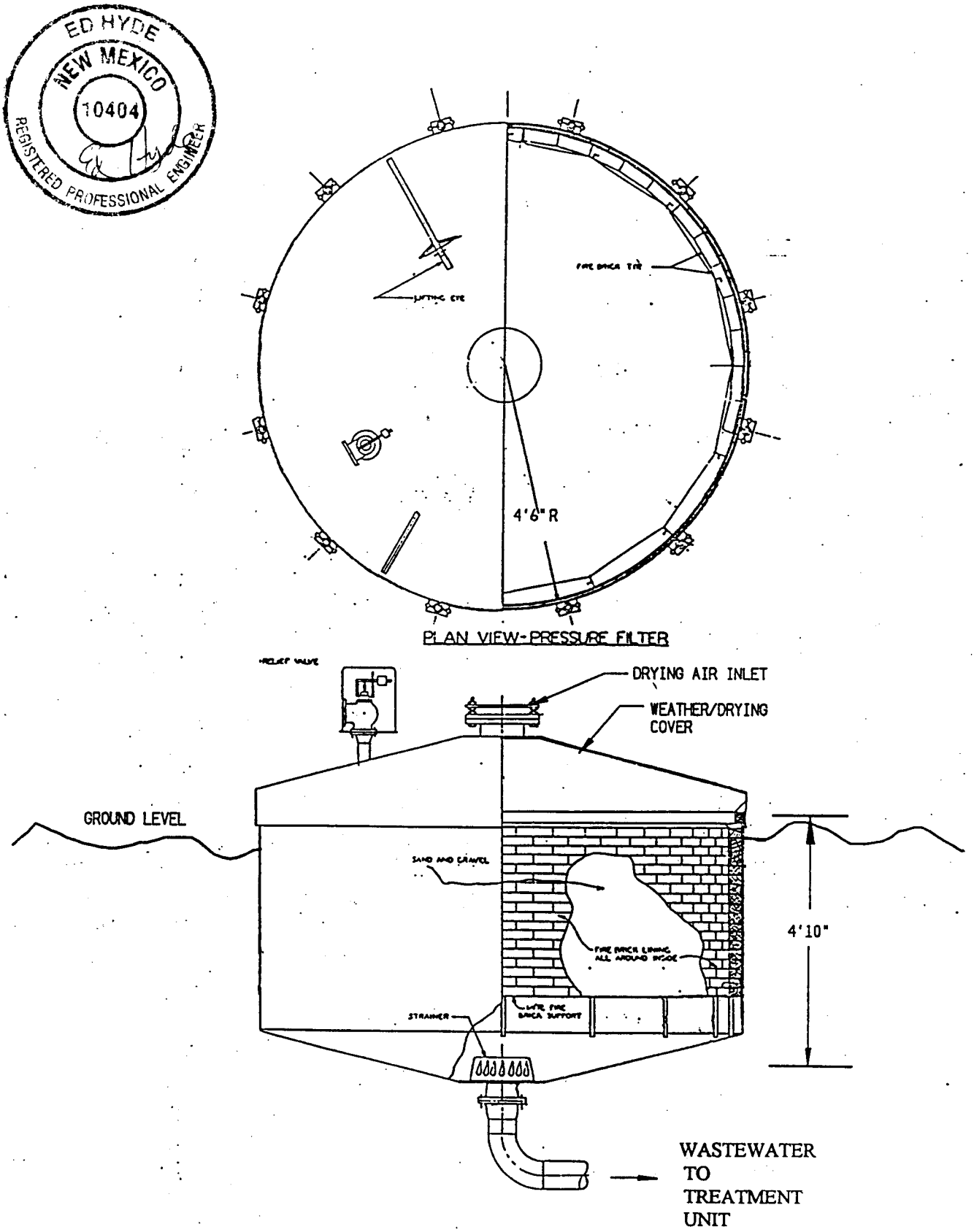


Figure 4-10

Schematic of TA-16-401 and TA-16-406 Pressure Vessels

ATTACHMENT 4-1

SUPPLEMENTAL AIR QUALITY INFORMATION

SUPPLEMENTAL INFORMATION

Overview of Emissions

Table 1 shows the current (1994) estimated emissions for all operations at the Technical Area (TA) 16 burn grounds. Emissions were estimated using U.S. Environmental Protection Agency (EPA)-approved emission factors from the EPA document "Compilation of Air Pollutant Emission Factors" (AP-42), heat and mass balance calculations, and theoretical model calculations. Emissions for carbon filter burning and volatile organic compounds (VOC)/hazardous air pollutants (HAP) evaporation were estimated with no off-site impact modeling performed. In addition, emissions were estimated for the proposed use of propane at the flash pad operation to replace the wood currently used as the combustion source.

Air quality impacts of the combustion products carbon monoxide (CO), nitrogen oxides (NOx), particulate matter (PM), nonmethane hydrocarbons, and VOCs were assessed at the nearest off-site receptor (State Road 4 bordering Bandelier National Monument) 1,828 meters to the south for ambient air. Compliance with the standard was evaluated using the SCREEN 2 air emissions dispersion model. The SCREEN 2 model has been approved by EPA as a screening procedure for estimating air quality impacts of stationary sources. SCREEN 2 is a conservative model which uses worst case meteorological data to determine emission impacts.

Table 1

Emission Estimates by Source

Emission Source	Chemical Emitted	Average Yearly Emissions (lb/yr)[a]	Hourly Emissions (lb/hr)[b]
VOC Evaporation	Methyl Ethyl Ketone	101.26	0.00277
	Butyl Acetate	101.26	0.00277
	Ethyl Acetate	101.26	0.00277
	Toluene	101.26	0.00277
	Methanol	101.26	0.00277
	Ethanol	101.26	0.00277
	Acetone	101.26	0.00277
	Cyclohexane	101.26	0.00277
	Tetrahydrofuran	101.26	0.00277
	Acetonitrile	101.26	0.00277
	VOC/HAPs	1012.6	0.0277
Carbon Filter Burning	CO	0.23	0.23
	VOC/HAPs	0.61	0.61

Table 1 (Continued)

Emission Estimates by Source

Emission Source	Chemical Emitted	Average Yearly Emissions (lb/yr)[a]	Hourly Emissions (lb/hr)[b]
	PM	0.76	0.76
Solvent Burning	CO	19	0.38
	NOx	3683	74
	VOC/HAPs	55	1.1
	PM	92.5	1.85
Slurry Burning/ Waste High-Explosives (HE) Burning	CO	485.6	20.23
	NOx	1264.8	52.7
	VOC/HAPs	48.2	2.036
	PM	2540.6	105.86
	Hydrogen Fluoride (HF)	497.8	20.74
	Hydrogen Chloride (HCl)	278.8	11.62
	Barium Oxide (BaO)	118	4.92
	Phosphate (PO4)	72	3
HE-Contaminated Equipment Flashing			
1600 lb wood	CO	312	6.5
	NOx	42.2	0.9
	PM	147.9	3.1
	VOC/HAPs	21.8	0.5
22 lb propane	CO	0.4	0.02
	NOx	2.4	0.1

Table 1 (Continued)

Emission Estimates by Source

Emission Source	Chemical Emitted	Average Yearly Emissions (lb/yr)[a]	Hourly Emissions (lb/hr)[b]
	PM	0.08	0.003
	VOC/HAPs	0.07	0.003
TOTALS[c]	CO	816.83	20.23
	NOx	4990	74
	VOC/HAPs	1136.21	2
	PM	2781.76	105.9
	HF	497.8	20.7
	HCl	278.8	11.6
	BaO	118	4.9
	PO4	72	3

[a] lb/yr = pounds per year
[b] lb/hr = pounds per hour
[c] Hourly emissions are from the largest hourly emitting source; slurry burning/waste HE Burning

Source-Specific Emission Estimates and Associated Off-Site Impacts

Waste HE Burning

Currently, 36,000 gallons of sump slurry are pumped into trucks and transported to the HE wastewater treatment facility each year. The slurry is poured over a sand filter, tightly sealed, and heated with air until dry. All of the wastewater filters through the sand and is collected in an underground catch pipe running to the input tank of the wastewater treatment facility. The remaining slurry solids containing particles of dry HE, inert plasticizers, and binders (10,000 lb/yr) remain on top of the sand filter. This dry slurry is then ignited and allowed to combust. Burning occurs monthly and lasts approximately one hour.

Waste HE is generated by the HE Processing Facilities in the form of chunks, shavings, etc. The burning of waste HE is required to eliminate the safety concerns that accompany disposal by conventional means (i.e., transportation and burial). Approximately 10,000 lb of HE waste are combusted yearly. Emissions estimates from HE burning are shown in Table 2 and potential air quality impacts from HE burning are given in Table 3.

Table 2

Emission Estimates For HE Burning

Emission Source	Chemical Emitted	Average Yearly Emissions (lb/yr)	Hourly Emissions (lb/hr)
Slurry Burning/ Waste HE Burning	CO	485.6	20.23
	NOx	1264.8	52.7
	VOC/HAPs	48.2	2.04
	PM	2540.6	105.86
	HF	497.8	20.74
	HCl	278.8	11.62
	BaO	118	4.92
	PO4	72	3

Table 3

Potential Air Quality Impacts From HE Burning

Chemical	Ambient Air Quality Standard		Air Concentration At Nearest Off-site Location[a]
CO	8-hour average 1-hour average	8.7 ppm[b] 13.1 ppm	0.036 ppm 0.052 ppm
NOx	24-hour average Annual arithmetic average	0.1 ppm 0.05 ppm	0.05 ppm 0.004 ppm
PM	24-hour average 7-day average 30-day average Annual geometric mean	150 ug/m^3[c] 110 ug/m^3 90 ug/m^3 60 ug/m^3	108.32 ug/m^3 49.9 ug/m^3 7.2 ug/m^3 7.1 ug/m^3
Nonmethane hydrocarbons	3-hour average	0.19 ppm	0.005 ppm
Photo Chemical Oxidant (VOC)	1-hour average	0.06 ppm	0.005 ppm

a Receptors are at Bandelier National Monument
b ppm = parts per million
c ug/m^3 = micrograms per cubic meter

Solvent Burning

Approximately 2,500 gallons per year of HE-contaminated dilute solvents and lubricant oil are generated during HE processing operations at Los Alamos National Laboratory. These solvents and oils are open burned in specialized solvent trays at the TA-16 burn grounds. Fifty burns per year, each consisting of up to 50 gallons, make up the burn tray operations. The average make-up of the dilute solvent solution is 30% methanol, 25% water, 20% acetonitrile, 20% tetrahydrofuran, 5% of any the solvents in Table 1, and trace amounts of HE. The burning of pump oil contaminated with HE makes up approximately 10% of the burns. Table 4 gives the chemical assumptions required for the emission calculations. Combustion emissions were estimated using emission factors and equations from A. Tewarson, "Prediction of Fire Properties of Fuels," (Factory Mutual Research Corporation, 1985). Emission estimates and air quality impacts from solvent burning and oil burning are shown in Tables 5 and 6.

Table 4

Chemical Properties Of Solvents and Pump Oil

Solvent Type	Molecular Weight (grams/mole)	Density (grams/ milliliter)	Number of Carbons	Assumptions Used For Calculations
pump oil[a]	72	0.9050	5	[b]
methanol	32	0.7914	1	experimental data available
acetonitrile	41	0.7868	2	C_2 linear alkanes
tetrahydrofuran	72	0.8888	4	C_3-C_6 linear ketones
methyl ethyl ketone	72	0.8054	4	C_3-C_6 linear ketones
butyl acetate	116	0.8825	6	C_5-C_{10} acetate
ethyl acetate	88	0.9003	4	C_4 acetate
toluene	92	0.8669	7	experimental data available
ethanol	46	0.7893	2	experimental data available
acetone	58	0.7899	3	experimental data available
cyclohexane	84	0.7785	6	C_5 -C_{10} cyclo alkane

[a] Approximated as n-Pentane (C_5H_{12}).
[b] Used average of values given for linear, branched, and cyclic alkanes (paraffins).

Table 5

Emission Estimates From HE-Contaminated Solvent and Lubricant Oil Burning

Emission Source	Chemical Emitted	Yearly Emissions (lb/yr)	Hourly Emissions[a] (lb/hr)
Solvent Burning	CO	19	0.38
	NOx	3683	74
	VOC/HAPs[b]	55	1.1
	PM	92.5	1.85
Lubricant Oil Burning[c]	CO	12	2.42
	VOC/HAPs	10.7	2.15
	PM	48.7	9.74

a Each burn lasts approximately one hour.
b Tewarson estimates hydrocarbons; for this discussion they are totaled as VOC/HAP's.
c Lubricant oil burning accounts for approximately 10% of the burn tray operations.

Table 6

Air Quality Impacts From Solvent Burning

Chemical Pollutant	Modeling Parameters	Ambient Air Quality Standard		Impact at Receptor[a]
CO	Class D Stability	8-hour average 1-hour average	8.7 ppm 13.1 ppm	0.004 ppm 0.006 ppm
NOx	2.5 meters per second wind speed	24-hour average Annual arithmetic average	0.1 ppm 0.05 ppm	0.04 ppm 0.009 ppm
PM	Heat released: 87,030 calories per second	24-hour average 7-day average 30-day average Annual geometric mean	150 ug/m^3 110 ug/m^3 90 ug/m^3 60 ug/m^3	10.7 ug/m^3 Not Calculated Not Calculated 2.1 ug/m^3
Nonmethane hydrocarbons		3-hour average	0.19 ppm	0.004 ppm
Photo Chemical Oxidant (VOC)		1-hour average	0.06 ppm	0.005 ppm

[a] Receptor at Bandelier National Monument.

Flash Burning Operations

Air emissions from flash burning of HE-contaminated materials result from the combustion of wood and paper products. The flashing operation is permitted by the State of New Mexico Environment Department's Air Pollution Control Bureau under Air Quality Control Regulation 301 - Regulation to Control Open Burning. Emissions from the flashing operation area estimated using emission factors developed by EPA for the combustion of wood and paper products (Table 7).

Air quality regulations require that emissions from the flashing operation must not impact the ambient air quality standards set forth by federal statutes and adopted by the State of New Mexico. Operations of this type must meet ambient air standards for the criteria pollutants CO, NOx, PM, nonmethane hydrocarbons, and VOCs (Table 8).

Table 7

Emission Estimates For Flashing Operations

Emission Source	Chemical Emitted	Average Yearly Emissions (lb/yr)	Hourly Emissions (lb/hr)
HE-Contaminated Equipment Flashing			
1,600 lb wood	CO	312	6.5
	NOx	42.2	0.9
	PM	147.9	3.1
	VOC/HAPs	21.8	0.5
22 lb propane	CO	0.4	0.02
	NOx	2.4	0.1
	PM	0.08	0.003
	VOC/HAPs	0.07	0.003

Table 8

Air Quality Impacts From Flash Burning Operations

Chemical	Ambient Air Quality Standard		Air Concentration At Nearest Off-site Location[a]
CO	8-hour average 1-hour average	8.7 ppm 13.1 ppm	0.009 ppm 0.01 ppm
NOx	24-hour average Annual arithmetic average	0.1 ppm 0.05 ppm	0.0006 ppm 0.00008 ppm
PM	24-hour average 7-day average 30-day average Annual geometric mean	150 ug/m^3 110 ug/m^3 90 ug/m^3 60 ug/m^3	3.7 ug/m^3 0.5 ug/m^3 0.3 ug/m^3 0.2 ug/m^3
Nonmethane hydrocarbons	3-hour average	0.19 ppm	0.0003 ppm
Photo Chemical Oxidant (VOC)	1-hour average	0.06 ppm	0.0003 ppm

[a] State Road 4 bordering Bandelier National Monument 1828 meters to the south/southwest.

ATTACHMENT 4-2

SUPPLEMENTAL WATER QUALITY INFORMATION

INTRODUCTION

This attachment addresses requirements of Title 40 of the Code of Federal Regulations (40 CFR) Part 264, Subpart X—Miscellaneous Units. The requirements of this subpart apply to owners and operators of facilities that treat, store, or dispose of hazardous waste in miscellaneous units. To specifically address the requirements that deal with potential contaminant migration transport pathways, a model was constructed to simulate a contaminant spill on the flash pad followed by an unusually-heavy rainstorm. Contaminant concentrations were then estimated for the point where runoff mixes with water flowing in the canyon bottom.

BACKGROUND

In order to evaluate potential contamination of surface and groundwater from Flash Pad 387, a number of assumptions were made about the geology and hydrology of the site, contaminants likely to be present, and the climatology of the site. This specific site, as well as surrounding areas in close proximity to Technical Area (TA) 16, has been studied extensively for many years as part of environmental impact statements, environmental surveillance reports, environmental monitoring programs covering ground water and surface water and air quality, and Resource Conservation and Recovery Act (RCRA) and Hazardous and Solid Waste Amendments (HSWA) activities, including closure and post-closure plans. Information providing the basis for the discussion, assumptions, and calculations, is contained in several previously-published documents. To enable the reader to easily follow the discussion, rather than only referring to information from these documents, the information is excerpted in this attachment where used. The following documents were used extensively in preparing this attachment:

- Closure and Post-Closure Plan for Material Disposal Area P, Volume 1 (ERM/Golder, 1993) supplied inputs for site-specific storm water run-on and runoff, soil characteristics, waste characterization, and site hydrology. These inputs entered into the discussions of transport mechanisms and pathways from Flash Pad 387 at TA-16.

- Determination of 100-Year Floodplain Elevations at Los Alamos National Laboratory (McLin, 1992), furnished material used to evaluate storm runoff potential and to estimate canyon stream flows. It was also the source of data for the volume of water needed during a two-year storm event to create runoff from TA-16 at Flash Pad 387.

- Los Alamos Climatology Summary (Los Alamos National Laboratory [LANL], 1991a) supplied general information about precipitation in the Los Alamos area and also near TA-16.

PURPOSE AND SCOPE

40 CFR, Part 264, Subpart X, requires permit applicants to show that they can prevent any releases that may have adverse effects on human health or the environment due to migration of waste constituents in the ground water, surface water, soil, or subsurface environment.

This attachment studies and evaluates these possible waterborne waste transport pathways and their potential for contaminant migration. The attachment lists some of the contaminants of concern and shows their origin and nature. It presents a scenario for possible waterborne migration, based on site geology, hydrology, and meteorology.

The scenario uses assumptions which are extremes: a worst-case spill, a two-year precipitation event, and total contaminant movement (not taking into account adsorption, biodegradation, incomplete dissolution, etc). Results are compared to screening action levels (SAL) which are typically very conservative.

Additional information concerning the geology, hydrology, and meteorology is presented to support the Subpart X requirements and the presentation of the aforementioned scenario.

SITE CONDITIONS

HYDROGEOLOGY

For a detailed discussion of regional and LANL-specific hydrogeology, refer to Section 2.0 of the Part B permit application.

The hydraulic gradient of the main aquifer in the region averages about 60 to 80 ft/mile within the Puye Conglomerate but increases to 80 to 100 ft/mile along the eastern edge of the plateau as the water in the aquifer enters the less permeable sediments of the Santa Fe Group. The rate of movement of water in the upper section of the aquifer varies, depending on the aquifer materials. Aquifer tests indicate the movement ranges from 20 ft/year in the Tesuque Formation to 345 ft/year in the more permeable Puye Conglomerate (Purtymun, 1984). For additional details on the aquifer, refer to Section 2.0 of the Part B permit application.

Flash Pad 387 lies near the western margin of the Pajarito Plateau on a short, narrow mesa occupying both the edge of the mesa and the southern wall of the adjacent canyon, Cañon de Valle. To the north of the flash pad, the ephemeral stream in Cañon de Valle has cut steep canyon walls into the Bandelier Tuff and drains an area to the west. The canyon walls near Flash Pad 387 are over 100 ft high and expose moderately welded tuff undertain by welded tuff. The stream flow in Cañon de Valle results from surface runoff (storm water and snow melt), as well as discharge from a National Pollutant Discharge Elimination System (NPDES)-permitted outfall located upstream of Flash Pad 387. In the vicinity of the flash pad, the canyon has only a thin layer of alluvium of 2 to 7 ft in thickness (Brown et al. 1988) which could contain water from the stream perched on the underlying tuff. This is a common occurrence with water in major stream channels that cross the plateau. However, in Cañon de Valle no such perched water was found in a series of 17 boreholes drilled in the area between the foot of Material Disposal Area P (MDA-P) and the ephemeral stream at the canyon bottom (Brown et al., 1988). Subsequent monitoring of several of these boreholes, which were constructed as monitoring wells, has never shown the presence of groundwater. Cañon de Valle stream water joins a major intermittent stream in Water Canyon approximately two miles to the southeast. Water Canyon, in turn, flows into the Rio Grande approximately six miles to the east in White Rock Canyon.

Some of the hydrologic characteristics of the unsaturated tuff beneath the landfill have been characterized (LANL, 1993e). Many hydrologic characteristics depend on the degree of welding; the denser the welding, the lower the porosity and hydraulic conductivity. The porosity

of moderately welded tuff ranges from 30 to 55% by volume, while that of welded tuff ranges from 15 to 40% by volume. The saturated hydraulic conductivity for moderately welded tuff ranges from 0.1 to 1.7 ft/day (3.53×10^{-5} centimeters per second [cm/s]); the welded tuff ranges from 0.009 to 0.26 ft/day (3.18×10^{-6} to 6.00×10^{-4} cm/s); the welded tuff ranges from 0.009 to 0.26 ft/day (3.18×10^{-6} to 9.17×10^{-5} cm/s). The values for porosity and saturated hydraulic conductivity are consistent with the ranges of porosity (34 to 57%) and saturated hydraulic conductivity (2.25×10^{-5} cm/s to 5.15×10^{-4} cm/s) of tuff cores recovered near Flash Pad 387 and reported by Stephens (1988). However, reported values for volumetric moisture content of tuff are not as consistent; reported values from 1 to 6% (Purtymun, 1984) compared to 18 to 36% (Stephens, 1988).

METEOROLOGY

Precipitation

Normal annual precipitation, which includes rainfall and water-equivalent snowfall, totals nearly 19 inches (in.) (48 cm). Annual precipitation falls off rapidly toward the valley, with the normal White Rock precipitation at 13.5 in. (34 cm). Annual precipitation normally totals more than 25 in. (64 cm) in the adjacent Jemez Mountains. The increasing amount of precipitation toward the mountains is especially noticeable during the summer when thundershowers develop over the mountains. Showers tend to form, or be stronger, over the mountains for much of the year. Also, winter storms associated with upslope winds drop more snow higher on the plateau.

Los Alamos precipitation is characteristic of a semiarid climate in that variations in precipitation from year to year are quite large. For instance, the annual precipitation extremes range from 6.80 to 30.34 in. (17.77 to 77.06 cm) over a 71-year period. The standard deviation over the same period was 4.81 in. (12.22 cm), or 25% of the mean. In 1986, 30.01 in. fell at the North Community site, near the Jemez Mountains (LANL, 1991a). Precipitation information is given in Table 1.

Temperature

Despite Los Alamos' southern location, temperatures are cool at the nearly 7,400-ft (2,255-meters [m]) above sea level (ASL) elevation. Mean temperatures vary with altitude, averaging 5 degrees Fahrenheit (°F) (3 degrees Celsius [°C]) higher in and near the Rio Grande Valley (6,500 ft [1980 m] ASL) and 5°F to 10°F (3°C to 5.5°C) lower in the nearby Jemez Mountains (8,500-10,000 ft [2,600-3,050 m] ASL).

Winter temperatures typically range from 15°F to 25°F (-9°C to -4°C) during the night and from 30°F to 50°F (-1°F to 10°F) during the day. Cold arctic air masses occasionally invade the Los Alamos area from the north and northeast, but often the shallow layer of coldest air is dammed to the east by the Sangre de Cristo Mountains. Occasionally, Los Alamos temperatures drop to 0°F (-18°C) or below.

Summers have moderately warm days and cool nights. Afternoon temperatures are in the 70s and 80s (°F) (21°C to 32°C) and occasionally reach 90°F (32°C), especially in White Rock. The relatively thin air, light winds, clear skies, and dry atmosphere cause nighttime temperatures to drop to the 50s (°F) (10°C to 15°C), even after the warmest day. Table 1 summarizes Los Alamos and White Rock temperatures.

TABLE 1

Monthly mean temperature and precipitation and median precipitation at Los Alamos and White Rock[a]

	Temperature (°F)				Precipitation (in)	
	Maximum	Minimum	Average	Daily Range	Mean	Median
January	39.5 (41.7)	17.4 (14.6)	28.4 (28.1)	22.1 (27.1)	0.86 (0.57)	0.79 (0.67)
February	43.5 (46.5)	21.1 (19.5)	32.3 (33.0)	22.4 (27.0)	0.80 (0.58)	0.66 (0.48)
March	49.6 (54.9)	26.5 (26.4)	38.0 (40.6)	23.1 (28.5)	1.22 (0.87)	1.07 (0.72)
April	58.4 (63.1)	33.3 (33.1)	45.8 (48.1)	25.1 (30.0)	1.01 (0.68)	0.63(0.44)
May	67.6 (72.0)	42.0 (41.3)	54.8 (56.6)	25.6 (30.7)	1.17 (0.97)	1.05 (0.96)
June	77.8 (82.7)	51.1 (50.6)	64.5 (66.7)	26.7 (32.1)	1.36 (1.00)	0.91 (0.82)
July	80.6 (85.6)	55.3 (55.9)	68.0 (70.7)	25.3 (29.7)	3.26 (2.23)	3.36 (2.05)
August	77.5 (82.5)	53.5 (54.0)	65.5 (68.3)	24.0 (28.5)	3.52 (2.37)	3.24 (2.21)
September	71.1 (76.0)	47.2 (46.5)	59.1 (61.2)	23.9 (29.5)	2.12 (1.52)	2.01 (1.55)
October	61.5 (65.5)	37.6 (35.2)	49.6 (50.3)	23.9 (30.3)	1.30 (1.13)	1.05 (0.60)
November	48.9 (52.7)	27.1 (24.6)	38.0 (38.7)	21.8 (28.1)	1.02 (0.77)	0.67 (0.56)
December	40.8 (43.0)	19.4 (16.1)	30.1 (29.6)	21.4 (26.9)	1.08 (0.81)	0.74 (0.59)
Annual	59.7 (63.9)	36.0 (34.8)	47.8 (49.3)	23.8 (29.0)	18.72 (13.5)	19.0 (13.52)

[a] White Rock data are in parentheses.

Current Water, Soil, and Air Quality

Surface water, groundwater, soil, and sediments are routinely sampled at LANL as part of the environmental surveillance activities. Data on the quality of these media are published annually

in the environmental surveillance reports, i.e., Environmental Surveillance at Los Alamos during 1992 (LANL, 1994b).

The supply well closest to TA-16 is PM-2 located in Pajarito Canyon. The total withdrawal rate for 1991 was 171 million gallons (LANL, 1994d).

SITE CHEMICALS AND ACTION LEVELS

SCREENING ACTION LEVELS FOR NONRADIOLOGICAL CONSTITUENTS

SALs have been derived for environmental restoration activities at LANL. The Environmental Restoration (ER) Program at LANL takes its primary direction from U.S. Environmental Protection Agency (EPA) guidance (EPA, 1989). Subsequent guidance, Corrective Action for Solid Waste Management Units (Subpart S) (EPA, 1990c), a proposed regulation under RCRA, presents a methodology for calculating action levels to determine the need for further evaluation of contamination in various environmental media (i.e., groundwater, surface water, air, and soil). The action levels are calculated using chemical-specific toxicity values and default exposure parameters. In order to comply with the HSWA Module for LANL, SALs have been developed that follow the Subpart S methodology for exposure parameter defaults but that incorporate more recent toxicity values available from the EPA's Integrated Risk Information System (IRIS) database (EPA, 1992b) and Health Effects Assessment Summary Tables (HEAST), (EPA, 1992c), which are updated periodically.

SAL derivations are based on assumptions and equations contained in proposed Subpart S. A complete discussion of assumptions and equations is given in Appendix J of LANL's Installation Work Plan (LANL, 1993e).

In deriving SALs for constituents in water, it is assumed that a 70 kilogram (kg) adult ingests water at a rate of 2 liters per day (L/day) over a 70 year exposure duration. These SALs apply to constituents in both groundwater and surface water.

In keeping with Subpart S, when the maximum contaminant level (MCL) value or state groundwater standard is not available, the value calculated using the specified exposure assumptions for water will be used as the SAL. Although not specifically stated, it is consistent with Subpart S to use the same SAL criteria for both groundwater and surface water constituents. For surface water constituents, these criteria may be more stringent than required because New Mexico has not designated surface waters to be evaluated as drinking water sources.

CHEMICALS OF CONCERN

Chemicals of concern for Flash Pad 387 at TA-16 are those that may potentially migrate from the site in quantities above the established SALs. Three examples of these were chosen for the

hypothetical scenario covered in the following section. These chemicals are listed in Table 2 along with some of their chemical and physical properties.

TABLE 2

Chemicals of Concern - Physical Chemical Information[a]

Compound	CAS no.	Solubility in water @ 20°C (mg/L)[b]	Vapor Pressure (mm Hg)[c]	Henry's Law (atm-m³/mol)[d]	Screening Action Levels[g] Soil (mg/kg)[e]	Water (µg/L)[f]
Barium Di-nitrate	10022-31-8	8.70E+04[h]			5.60E+03	2.00E+03
Toluene	108-88-3	5.35E+02	2.81E+01	6.37E-03	9.10E+02	1.00E+03
2,4-dinitrotoluene	121-14-2	2.40E+02	5.10E-03	5.09E-06	1.00E+00	5.00E-02

[a] Most data from Superfund Public Health Evaluation Manual EPA/540/1-86/060, OSWER Dir. 9285.4-1, October 1986.
[b] mg/L = milligrams per liter.
[c] mm Hg = millimeters of mercury.
[d] atm-m³/mol = atmospheres-cubic meter per mole.
[e] mg/kg = milligrams per kilogram.
[f] µg/L = micrograms per liter.
[g] Screening Action Levels from the 1993 Installation Work Plan.
[h] Solubility value for Barium di-nitrate from Handbook of Chemistry and Physics, 65th ed.

EVALUATION OF POSSIBLE CONTAMINATION TRANSPORT PATHWAYS

INTRODUCTION

The following scenario is presented as a conservative evaluation of possible contaminant loading and transport to surface and groundwater systems. No data were available from the flash pad site as sampling has not been performed yet. A hypothetical spill is used as the source term for this evaluation.

SURFACE WATER TRANSPORT

A scenario is described below to evaluate potential impacts of the TA-16 Flash Pad 387 to surface waters. The document, *Determination of 100-Year Floodplain Elevations at Los Alamos National Laboratory* (McLin, 1992), shows that the minimum precipitation event that results in overland runoff and flow into Cañon de Valle occurs only during a two-year, six-hour rainfall, or more intense precipitation event. During this event 1.38 in. of precipitation fall at the flash pad (McLin, 1992). This results in a total flow in Cañon de Valle, below Flash Pad 387, of 21,600 cubic feet (ft^3) over a six hour time period (McLin, 1992). This is the volume of water available to dilute contaminant-laden runoff from the mesa top. The contaminants may be dissolved in the precipitation and transported to the canyon bottom.

Routine operations should not result in significant quantities of contaminants available for dissolution by runoff. To evaluate the potential for contaminant movement from Flash Pad 387 a hypothetical scenario is used. This scenario assumes that a chemical spill occurred which contained the three most common materials at the site: barium nitrate [$Ba(NO_3)_2$], toluene, and 2,4-dinitrotoluene (DNT). The constituents remained on the ground in the vicinity of the site and were mobilized during the next precipitation event that results in runoff (i.e., the two-year storm event). In the absence of actual data from the site these compounds were chosen to represent the constituents of concern to illustrate the potential for contamination movement. These constituents were chosen because they are toxic, are significantly mobilized by water, and are commonly present at the site.

Constituents of Hypothetical Spill

One-half kg of $Ba(NO_3)_2$ is spilled. $Ba(NO_3)_2$ is a major compound present in the high explosive (HE) before it is flashed. It is assumed that this is a finely divided solid powder and the entire

quantity is dissolved and mobilized during the precipitation event. Due to the high solubility of $Ba(NO_3)_2$, all of it is assumed to be dissolved and carried to the stream channel in the canyon below the site.

A quantity of toluene is spilled with a pattern of distribution covering 100 square feet (ft^2). Due to its high vapor pressure it is likely that this solvent would evaporate quickly. For purposes of this scenario, all of it is assumed to be available for transport as a dissolved constituent in surface water runoff.

Several pieces of DNT are also present in the spill and remain on the ground. The total surface area of the pieces exposed to precipitation is three in. by three in. resulting in a total exposed surface area of 0.06 ft^2. For the purposes of this calculation it is assumed that there is a sufficient mass of DNT to permit chemical saturation of all the precipitation that falls on these pieces. Any amount of HE in excess of the quantity required for chemical saturation will remain on the soil after the precipitation event.

Concentrations Observed from the Hypothetical Spill

Table 3 presents the concentrations of the constituents of concern in Cañon de Valle during the scenario two-year precipitation event. The values were calculated by assuming that all the precipitation that fell on the constituents instantly reached chemical saturation. This saturated solution then discharges into the stream channel of Cañon de Valle where it is diluted by 21,600 ft^3 of runoff flowing through the canyon. The concentrations shown in the table are the concentrations of the surface water in Cañon de Valle stream channel after mixing with the contaminant-laden runoff flowing down from the mesa top.

TABLE 3

Concentrations Observed in Cañon de Valle Surface Water Resulting from Hypothetical Spill

Constituent of Concern	Hypothetical Area or mass	Solubility in water @ 20°C	Calculated Concentration in drainage	SAL
Barium	0.5 kg	87 g/L[a]	0.8 mg/L	2 mg/L
Toluene	100 ft^2	535 mg/L	0.3 mg/L	1 mg/L
Di-nitrotoluene	0.06 ft^2	240 mg/L	0.08 mg/L	0.05 mg/L

[a] g/L = grams per liter

While the concentrations in the stream channel are close to the SALs, it should be noted that they were determined using the assumption that a 70-kg adult ingests water at a rate of 2 L/day for 70 years. The concentrations in Table 3 were developed for a single precipitation event lasting six hours and occurring, on average, once every two years.

Table 3 presents the results of an unlikely scenario where significant quantities of three toxic materials remain on the ground. Under this scenario the constituents of concern will be close to or below the SALs at the point the runoff from the mesa top enters the Cañon de Valle stream channel. The concentrations listed in Table 3 do not consider further dilution that will occur as the contaminants move downstream and the stream channel collects more runoff. A significant reduction in the concentrations will occur at the confluence with Water Canyon.

The assumptions used for the proceeding calculations are conservative. No allowance was made for degradation (see Table 4), or for sorption to soils or sediments. The calculation assumes that momentary contact with rainwater is sufficient to cause chemical saturation. It should also be noted that no provision for physical mass transport of HE solid particles is considered. The assumption is that the pieces are of sufficient mass that they will not be moved off the flash pad.

While it is anticipated that DNT will only be available for surface or groundwater contamination in the event of an unremediated spill, it is useful to consider its persistence in the environment. Table 4 presents half-lives for 2,4-dinitrotoluene in various environmental media. The half-lives in surface water are on the order of a few tens of hours and indicate that DNT will be

to one percent of the initial concentration. This will occur in one day if the low value is used or ten days if the high value is used.

TABLE 4

2,4-Dinitrotoluene Half-lives

Medium	Half-life	Half-life
Air	72	23
Surface Water	33	3
Groundwater	8640	48
Soil	4320	672

Source: Howard et al., 1991.

The Table 5 shows measured concentrations of barium in Cañon de Valle. These data were collected as part of vadose zone monitoring investigation for the MDA-P landfill (ERM/Golder, 1993). These values are for points upstream from where runoff from the flash pad would enter the stream channel. This report suggests that the NPDES outfall at TA-16, Building 260 is the primary source of the barium observed in the surface waters. The values in Table 5 are one-to-two orders of magnitude higher than the values found in Table 3 which are anticipated for an inadvertent release from Flash Pad 387 operations.

TABLE 5

Barium and Nitrate Concentrations in Water Samples
Canon de Valle Stream Survey

STATION	STATION DESCRIPTION	BARIUM (mg/L)	NITRATE (mg/L)
1	Channel at Highway 4	dry	dry
2	Channel below old pond	35.8	< 0.2
3	Channel above Building 260	9.9	0.8
4	Building 260 NPDES outfall	4.4	0.8
5	Tributary above outfall	dry	dry
6	Tributary below outfall	6.4	7.7
7	Tributary below outfall	38.1	< 0.2
8	Tributary below outfall	39.9	2.5
9	Channel below outfall	10.0	0.8
10	Channel below outfall	12.4	0.7
11	Channel below outfall	9.1	0.8
12	Channel below outfall	8.7	0.6
13	Channel above landfill	9.5	0.6
14	Channel below landfill	9.5	Not available

Source: ERM/Golder, 1993.

GROUNDWATER TRANSPORT

The potential for precipitation to carry contaminants from the mesa tops downward to water-bearing zones is low due to the thickness and extreme dryness of the underlying soils and rock. Most rainwater which falls onto the mesa top will migrate into the upper soil horizon and be stored until it is removed by capillary action and is transpired back into the atmosphere. Volatile contaminants that are dissolved in this water such as toluene, will either be vaporized or degraded. DNT will chemically precipitate in the soil horizon and ultimately be degraded in a matter of months. Barium will precipitate out of the infiltrating waters and build up in the upper

soil horizon. The depth of penetration of the infiltrating waters will depend upon the amounts and duration of rainfall and whether the waters intercept a fracture or fault. The likelihood of migration downward through the rock pores is low.

Information from previous studies (DEIS; ERM/Golder, 1993) suggest that the soil moisture profile for this mesa is very dry and that penetration is shallow. The MDA-P landfill, whose history spans 40 years, contains high levels of barium (i.e., up to 18,000 mg/L in simulated leachate by the extraction procedure [EP] toxicity procedure) and is unlined. However, additional data show that barium has only migrated to a depth of 10 feet below the bottom of the landfill (i.e., with EP toxicity values of 15 mg/l or less). These data suggest that migration downward is minimal and very slow.

No evidence exists to suggest that fractures or faults might affect infiltration at this site. Spring discharges which exist in canyon walls do suggest the presence of water-bearing zones above the main aquifer, but their discharges are into the canyon bottom and therefore contribute to the surface water.

Water will be present in the canyon bottom more frequently than during the two-year precipitation event required for runoff from the mesa top. This will dilute the waters that may contribute to groundwater, resulting in significantly lower concentrations. While the canyon bottom is the most likely pathway to groundwater aquifers, the concentration of contaminants in these waters will be low.

Although this facility is located on a mesa top, the greatest potential for groundwater contamination is through the canyon bottom below the site. Waterborne contaminants are more likely to move into the groundwater system through the canyon bottom due to the more frequent presence of water (LANL, 1993d). The earliest risk of groundwater contamination will be through the canyon bottoms.

CONCLUSION

These preliminary results suggest that the very low SAL for DNT makes it a constituent of potential concern. SALs for all other compounds expected to be present should be evaluated to determine levels of concern.

This straight forward analysis provides a conceptual model for evaluating the potential contribution to surface and groundwaters for contaminants that may be present at Flash Pad 387. Sampling results may suggest that more comprehensive modeling, including the kinetics of dissolution, degradation, sorption to soils, particle transport, bioaccumulation and groundwater contributions, is indicated.

ADDITIONAL REFERENCES

EPA (U.S. Environmental Protection Agency), October 1986, "Superfund Public Health Evaluation Manual," EPA/540/1-86/060, OSWER Directive 9285.4-1, Office of Emergency and Remedial Response, Washington, DC (EPA, 1986).

EPA (U.S. Environmental Protection Agency), May 1989, "Interim Final RCRA Facility Investigation (RFI) Guidance, Volume I of IV, Development of an RFI Work Plan and General Considerations for RCRA Facility Investigations," EPA/530-SW-89-031, OSWER Directive 9502.00-6D, Office of Solid Waste, Washington, DC (EPA, 1989).

EPA (U.S. Environmental Protection Agency), July 27,1990, "Corrective Action for Solid Waste Management Units (SWMUs) at Hazardous Waste Management Facilities," Vol. 55., pp. 30798-30884 (EPA, 1990c).

EPA (U.S. Environmental Protection Agency), October 1,1992, "Integrated Risk Information System (IRIS)," Water Office of Science and Technology: available from National Technical Information Service, Springfield, Virginia (EPA, 1992b).

ERM/Golder, August 1993, "Closure and Post-Closure Plan for Material Disposal Area P (MDA P) Los Alamos National Laboratory, Volume 1 of 2, Draft Revision 0._ (ERM/Golder, 1993).

Howard, Philip H. et al., 1991, Handbook of Environmental Degradation Rates. Printup, Heather Taub. Lewis Publishers (Howard, 1991).

Purtymun, W.D. et al., 1994, Water Supply at Los Alamos during 1991. LA-12770-PR Progress Report (LANL, 1994d).

Weast, Robert C, 1984, CRC Handbook of Chemistry and Physics. CRC Press, Inc., Boca Raton, Florida (Weast, 1984).

NPDES[a] Permit Discharge Standards

Effluent Characteristics	Regulatory Limit Daily Average	Regulatory Limit Daily Maximum
Chemical Oxygen Demand (COD)	125 milligrams per liter (mg/L)	125 mg/L
Total Suspended Solids (TSS)	30 mg/L	30 mg/L
pH	6.0 (min)	9.0 (max)
Oil and Grease	15 mg/L	15 mg/L
Aluminum	5.0 mg/L	5.0 mg/L
Arsenic	0.04 mg/L	0.04 mg/L
Boron	5.0 mg/L	5.0 mg/L
Cadmium	0.2 mg/L	0.2 mg/L
Chromium	5.1 mg/L	5.1 mg/L
Cobalt	1.0 mg/L	1.0 mg/L
Copper	1.6 mg/L	1.6 mg/L
Lead	0.4 mg/L	0.4 mg/L
Mercury	0.01 mg/L	0.05 mg/L
Selenium	0.05 mg/L	0.05 mg/L
Vanadium	0.10 mg/L	0.10 mg/L
Zinc	95.4 mg/L	95.4 mg/L
$^{226}Ra^{b} + {}^{228}Ra$	30.0 picocuries per liter (pCi/L)	30.0 pCi/L
Tritium	3,000,000 pCi/L	3,000,000 pCi/L

[a] NPDES = National Pollutant Discharge Elimination System.
[b] Ra = radium

5.0 PROCEDURES TO PREVENT HAZARDS

The information provided in this section is submitted in accordance with the applicable requirements of the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart IX, 270.14(b)(4), 270.14(b)(8), and 270.14(b)(9), and 20 NMAC 4.1, Subpart V, 264.14(b) and (c). The units addressed in this permit application are, or will be, designed and operated to minimize the possibility of fire, explosion, or unplanned releases of hazardous waste and/or hazardous constituents to any environmental medium. The following subject areas are addressed in this section: security; preparedness and prevention requirements; preventive procedures, structures, and equipment; and precautions for ignitable, reactive, or incompatible wastes.

5.1 TECHNICAL AREA (TA)-16 SECURITY [20 NMAC 4.1, Subpart IX, 270.14 (b)(4) and 20 NMAC 4.1, Subpart V, 264.14]

Security at TA-16 is maintained with both artificial and natural barriers. These barriers prevent the unknowing entry and minimize the possibility for unauthorized entry of persons or livestock into TA-16 and thus satisfy the requirements of 20 NMAC 4.1, Subpart V, 264.14(a) and (b)(2). A security fence surrounds approximately 50 percent of the perimeter of TA-16. Canyon walls and barbed wire surround the other 50 percent. The TA-16-88 container storage area addressed in this permit application is located within a high-explosives (HE)-exclusion area within TA-16. Access to TA-16-88 is along a fenced, ungated corridor with TA-16-54. The two open burn pads (TA-16-388, TA-16-399) and the flash pad (TA-16-387) located at TA-16 are each within a fenced area which can be locked if materials must be left on the pad for a period of time or while burned or flashed material is cooling. Access to TA-16 is limited by a security force which is present 24 hours a day. The burning ground is routinely patrolled by security personnel. The entry station is manned during operational hours. Appropriate entry and egress procedures are followed during manned, unmanned and emergency situations at TA-16. The gates and the area are patrolled by Los Alamos National Laboratory (LANL) security during nonoperational hours to ensure that fence integrity has not been breached. The locations of the security fence, entry gates, and entry station are shown on Figures 5-1 and 5-2.

Bilingual (i.e., English and Spanish) warning signs are posted on the fences surrounding the burn areas at approximately 50-foot (ft) intervals and can be seen from any approach to this area. The legends on the signs indicate "Danger-Hazardous Materials," "Authorized Persons Only," "Danger-Unauthorized Personnel Keep Out," and "Hazardous Waste Storage Area." The signs are legible from a distance of 25 ft.

5.2 PREPAREDNESS AND PREVENTION REQUIREMENTS [20 NMAC 4.1, Subpart V, 264.14 (c)]

This section discusses the preparedness and prevention requirements of 20 NMAC 4.1, Subpart V, 264.14(c). Prevention of hazards during unloading operations are included in the standard operating procedures (SOP) for transport and handling of HE-contaminated waste (Appendices C through J). Communication and alarm equipment available at LANL to provide emergency instructions for evacuation is presented in Section 7.0 of this application. Communication equipment is LANL-wide and in the event of an emergency allows personnel to contact the operating group management, the Emergency Management and Response Office, and/or the Central Alarm Station dispatcher (see Section 7.2.2). Emergency equipment available for use at the hazardous and mixed waste units addressed in this application is listed in Attachment 7-1. Responsibilities of internal and external emergency response groups are discussed fully in Section 7.1. Maintenance, testing, repair, and replacement (if necessary) of equipment to ensure proper functioning in the event of an emergency is described in Section 6.0.

5.3 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT [20 NMAC 4.1, Subpart V, 264.32 and 20 NMAC 4.1, Subpart IX, 270.14(b)(8)]

A description of the preventive procedures, structures, and equipment at TA-16 is presented below. This information is provided in accordance with the requirements of 20 NMAC 4.1, Subpart V, 264.32 and Subpart IX, 270.14(b)(8). Supplied water is of adequate volume and pressure for fire hydrants, hoses and sprinkler systems. In addition, the water-supply lines in the vicinity of both TA-16-88 and the TA-16 open burn units are under pressure and are equipped with backflow prevention devices.

Electrical power is supplied to TA-16-88 to operate lighting and telephone systems and is supplied to the TA-16 burn ground to operate lighting, telephone systems, and ignition controls. Operations in the container storage area and at the burn ground would be discontinued temporarily if electrical power was not restored quickly or if container handling equipment failed. However, neither a power nor an equipment failure would affect containment at the container storage area or the burn ground.

Personal protective clothing and equipment required for personnel involved in waste-handling activities may include protective coveralls, splash suits, steel-toed shoes, protective shoe coverings, impervious gloves, safety goggles, and face shields, depending on the waste being treated and the activities being conducted. Respiratory protection (e.g., respirator or self-contained breathing apparatus) will be donned if conditions require.

Section 6.0 discusses inspection procedures for safety equipment testing and maintenance.

5.3.1 Emergency Equipment at TA-16-88 Available for Use at the Hazardous and Mixed Waste Container Storage Area

Fire Control Equipment

Three fire extinguishers:

1 Halon is located next to the front door at the northwest corner of TA-16-88
1 Metal-X is located next to the front door at the northwest corner of TA-16-88
1 Container of graphite powder is located next to the front door at the northwest corner of TA-16-88

General capabilities

These portable units have a 30-pound capacity and may be used by any employee in the event of fire. Carbon dioxide (CO_2) and water fire extinguishers are located throughout TA-16.

One fire hydrant is approximately 100 ft south of TA-16-88

General capabilities

This fire hydrant will supply water at adequate volume and pressure to satisfy the requirements of 20 NMAC 4.1, Part V, 264.32.

Spill Control

The floor of TA-16-88 has been sealed with epoxy paint and is bermed along the interior walls to minimize contamination in the event of a spill.

Communication Equipment

Centron Telephone System:

One Centron telephone is located inside near the front door at the northwest corner of TA-16-88

One Centron telephone is located outside near the front door at the northwest corner of TA-16-88

General Capabilities

Telephones for internal and external communication are available for use by all employees. A video explaining alarms and evacuation procedures must be viewed prior to entering the site.

Decontamination Equipment

One portable eye wash available
Material Safety Data Sheets (MSDS) available

General Capabilities

The eye wash is used by personnel who receive a chemical splash to the eyes. MSDSs for the chemical(s) should be obtained prior to working with hazardous waste or hazardous material to determine if the application of water is indicated for decontamination.

Personal Protective Equipment

Air purifying respirators, first aid kits, and hearing protection gear are located in the control bunker.

5.3.2 Emergency Equipment Available at the TA-16 Burn Ground

Fire Control Equipment

Five fire extinguishers:

One at Building 1409
Two at the Waste Water Treatment Facility
Two at the main shelter

General Capabilities

These portable units have a 30-pound capacity and may be used by any employee in the event of fire. CO_2 and water fire extinguishers are located throughout TA-16.

Main fire hydrant in the middle of the burning ground
Fire hydrants in the area of TA-16-388 and -399
A boom truck, tank truck and dump truck are available

Spill Control

1 spill control kit in center of the burning ground
1 spill control kit in storage area 386
Spill control equipment in storage shed

Communication Equipment

2-way radios in TA-16-389 and in the mobile HE van
3 telephones at the burning ground
1 cellular telephone carried by burning ground technicians
Central public address system

General Capabilities

Telephones for internal and external communication are available for use by all employees

Decontamination Equipment

Portable eye washes throughout the facility
Material Safety Data Sheets Available

General Capabilities

The eye wash is used by personnel who receive a chemical splash to the eyes. MSDSs for the chemical(s) should be obtained prior to working with hazardous waste or hazardous material to determine if the application water is indicated for decontamination

5.4 PREVENTION OF ACCIDENTAL IGNITION OR REACTION OF IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE [20 NMAC 4.1, Subpart V, 264.17 and 20 NMAC 4.1, Subpart IX, 270.14(b)(9)]

Ignitable and/or reactive hazardous or mixed wastes (e.g., discarded mock HE and reactive metal debris) may be stored in containers at TA-16-88. In addition, ignitable and/or reactive hazardous wastes may be managed at the TA-16 open burn units. Any containers holding ignitable or reactive wastes are, or will be located at least 50 ft from the facility's property line at all times (refer to Map 2 of the TA-16 Part A permit application) and will be protected from sources of ignition or reaction. Administrative controls (i.e., special work permits) will be used at TA-16-88 whenever operations will be performed at the container storage area that involve open flame, cutting, sparking, or other sources of ignition. Potential problems will be identified prior to commencing work and, necessary precautions will be taken to minimize the possibility of accidental ignition at TA-16-88 and at the TA-16 open burn units. In addition, smoking is not allowed within TA-16-88 nor at the TA-16 open burn units. "No Smoking" signs are conspicuously placed at TA-16 wherever there is a potential hazard from ignitable or reactive waste, as required by 20 NMAC 4.1, Subpart V, 264.17(a).

Incompatible wastes, if stored at the container storage area in TA-16-88 or managed at the TA-16 open burn units, will be segregated to prevent adverse reactions from occurring through commingling of the wastes. In addition, no incompatible wastes will be mixed, and no waste will be placed in a container that previously held an incompatible waste, as required by 20 NMAC 4.1, Subpart V, 264.177(a) and (b), and 20 NMAC 4.1, Subpart IX, 270.15(d). If incompatible wastes are stored in the container storage area in TA-16-88, the requirements of 20 NMAC 4.1, Subpart V, 264.177(c), will also be met. Only containers made of or lined with materials that will not react with and are otherwise compatible with the waste to be stored will be used at the TA-16-88 container storage area and the TA-16 open burn units.

Specific precautions to prevent accidental ignition or reaction of ignitable, reactive, or incompatible wastes at the TA-16 open burn units are provided in the SOPs for TA-16 (see Appendices C through J).

5.5 SUPPORT AGREEMENTS WITH OUTSIDE AGENCIES [20 NMAC 4.1, Subpart V, 264.37(a)]

The U.S. Department of Energy maintains support agreements, contracts, and a memorandum of understanding for emergency response assistance at LANL with outside response agencies. LANL maintains contracts with additional response groups for security, site access, and

maintenance support during emergency response. These agreements are presented in the contingency plan, Section 7.0, of this permit application.

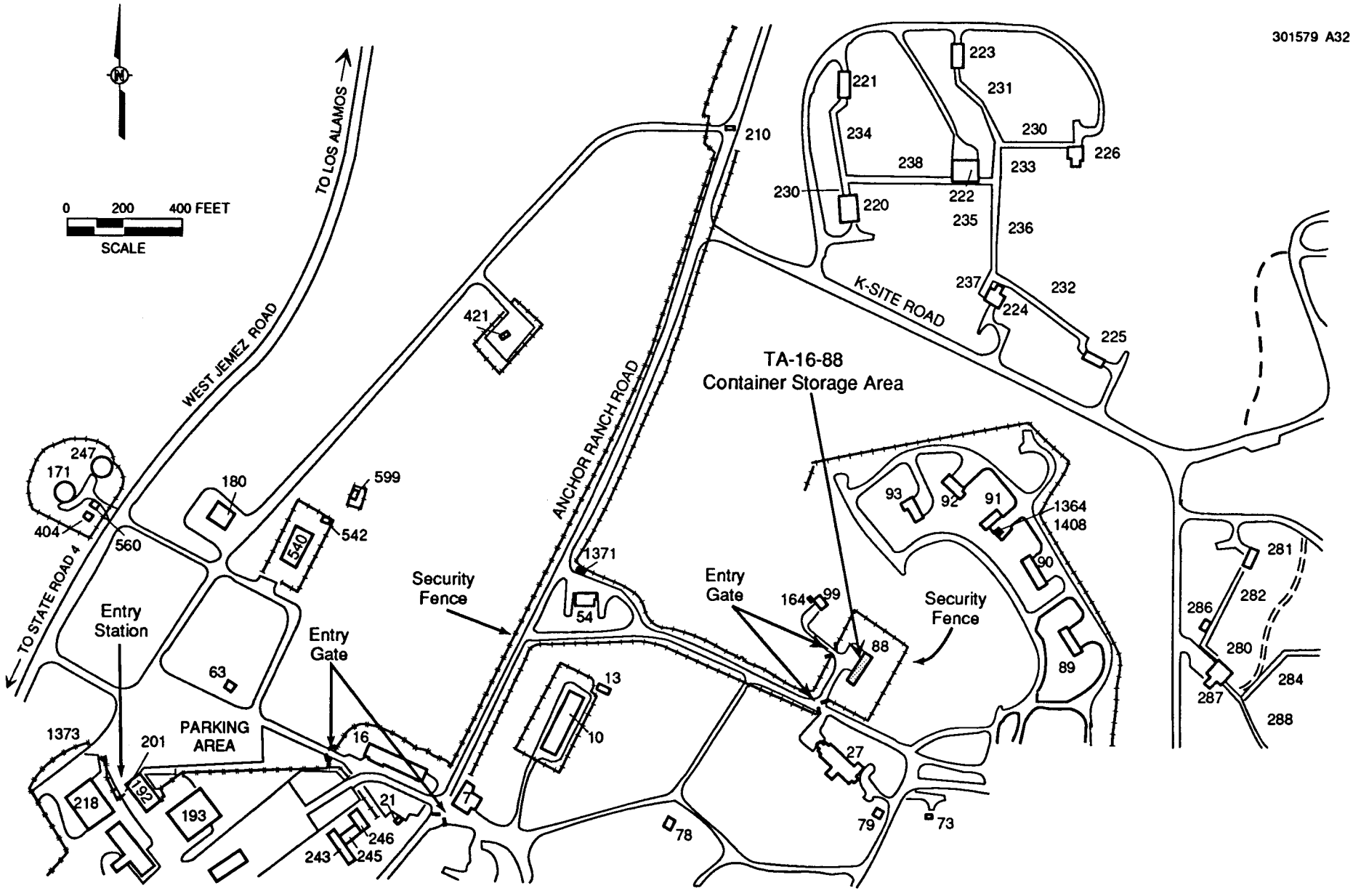


Figure 5-1

Location Map Showing Security Fence, Entry Station, and Entry Gates in the Vicinity of Technical Area (TA) 16, Building 88

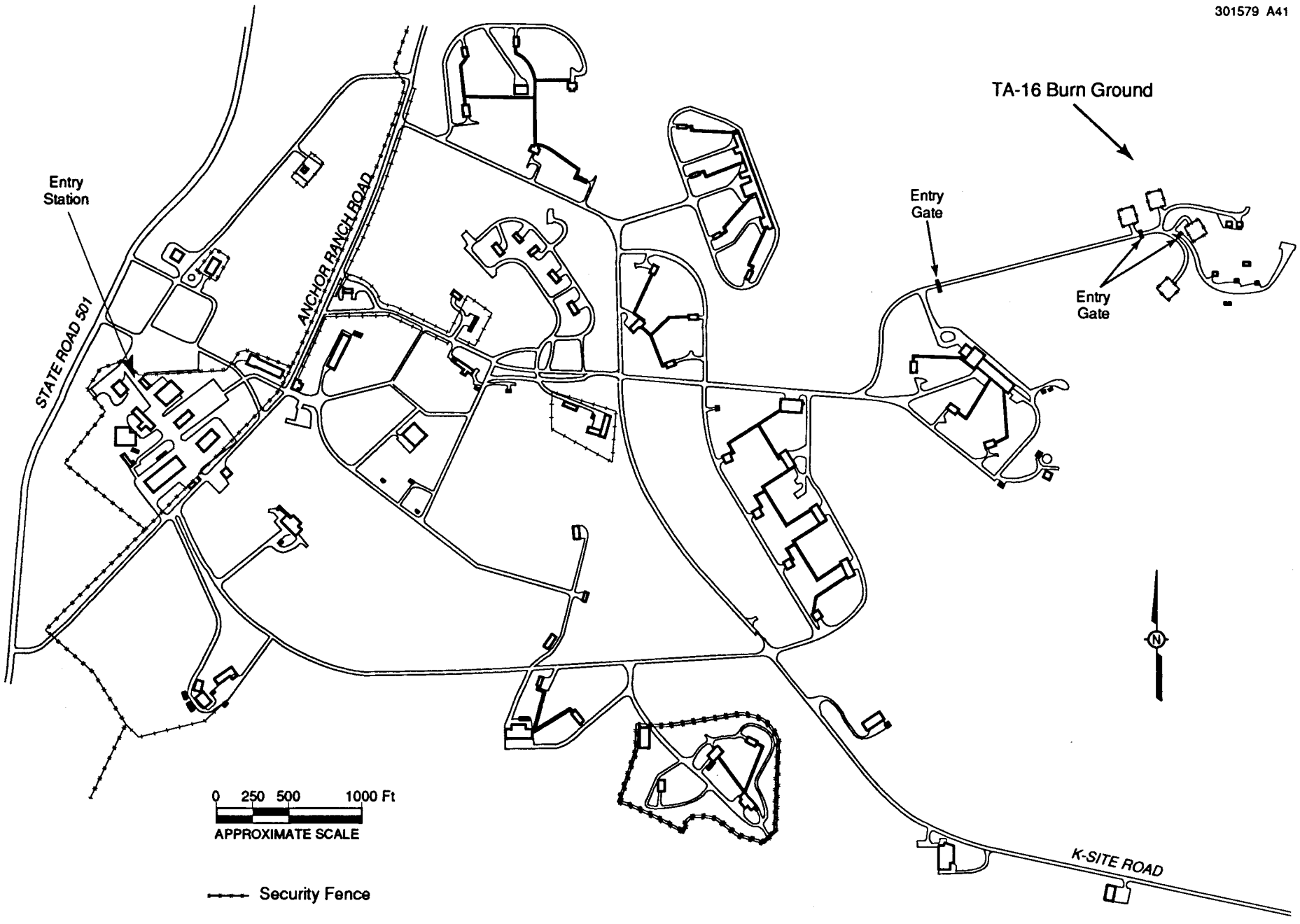


Figure 5-2
Location Map Showing Security Fence, Entry Station, and Entry Gates in the Vicinity of the Technical Area (TA) 16 Burn Ground

6.0 INSPECTION PLAN

In accordance with the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart V, 264.15, "General Inspection Requirements," this section presents inspection requirements for the hazardous and mixed waste container storage area and five hazardous waste open burn units at Technical Area (TA) 16 at Los Alamos National Laboratory (LANL). Inspection schedules for the units addressed in this permit application have been developed to identify equipment malfunctions and deterioration, operator errors, and discharges that might cause or lead to a release of hazardous or mixed waste and pose a threat to human health and the environment. As specified in 20 NMAC 4.1, Subpart IX, 270.14(b)(5), a copy of the general inspection schedule is being submitted with this Resource Conservation and Recovery Act permit application. Inspections will be conducted often enough to identify problems in time to correct them before they harm human health or the environment. Attachment 6-1 also gives problem-specific inspection instructions for each process or piece of equipment.

6.1 GENERAL INSPECTION SCHEDULES AND REQUIREMENTS [20 NMAC 4.1, Subpart IX, 270.14(b)(5); 20 NMAC 4.1, Subpart V, 264.15(a),(b), and (c)]

In accordance with the requirements of 20 NMAC 4.1, Subpart IX, 270.14(b)(5), and 20 NMAC 4.1, Subpart V, 264.15(a), (b), and (c), a written inspection schedule has been developed at LANL. This schedule will be followed for the inspection of monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that are important to preventing, detecting, and responding to environmental or human health hazards. The inspection schedule and copies of inspection records will be maintained at the facility by LANL's Hazardous and Solid Waste Group (ESH-19) and the site operator.

Inspection schedules outlining the items to be addressed on LANL's Hazardous and Mixed Waste Facility Inspection Record Form (IRF), as well as inspection frequencies, are provided in Section 6.2 for the unit types addressed in this application. The IRF and instructions for its completion are provided as Attachment 6-1. The activities discussed below are addressed according to the specified regulatory requirements as well as according to existing LANL inspection requirements for hazardous and mixed waste units.

6.1.1 Inspection Records [20 NMAC 4.1, Subpart V, 264.15(d)]

Inspection training is provided through LANL's Environment, Safety, and Health Training Group, with guidance from ESH-19. After training, personnel assigned from the operating group that manages the unit will conduct inspections and record the information on IRFs. For a minimum

of three years from the date of inspection, the groups responsible for these inspections will retain original records in inspection logbooks. They will send copies of the inspection records to ESH-19 at the end of each work week. ESH-19 will maintain their copies of the inspection records for a minimum of three years from the time the copy is received. The inspection records will be available for review in the event that the New Mexico Environment Department, the U.S. Environmental Protection Agency, or the U.S. Department of Energy inspects the facility for compliance with inspection requirements.

If necessary, ESH-19 may modify the IRF used at LANL or develop a form equivalent to it. Because the IRF is a comprehensive form that applies to all categories of both hazardous and mixed waste units, not all sections of the form apply to all units. The IRF encompasses 20 NMAC 4.1, Subpart V, requirements for permitted hazardous waste units; 20 NMAC 4.1, Subpart VI, interim status requirements; and additional requirements directed by LANL policy. All 20 NMAC 4.1, Subpart V, inspection requirements will be addressed at each of the open burn units and at the container storage area addressed in this permit application during each inspection. Instructions included with the IRF provide specific guidance for each inspection parameter listed.

The IRF will be completed according to the schedule provided in Section 6.2. In the event that the primary inspector is not available to complete the IRF, an alternate will be responsible for its completion. Where daily inspections are required, an inspection will be conducted and recorded in Parts I and II of the IRF for each working day that waste is processed or stored. For each working day that waste is not processed or stored, a check mark will be placed in the "No Use" block in Part I.

Weekly inspections must be conducted for each of the open burn units and for the container storage area. Inspections commence on the first working day of the week and are recorded in Parts I and II of the IRF. For each work week that waste is not processed or stored, a check mark will be entered in the "No Use" block in Part I of the IRF.

For every item requiring inspection (refer to Section 6.2), a response indicating the condition of each item must be entered in the column under the appropriate day of the week. The response is either "OK" or "AR" (action required). If the response is "AR," the action required must be noted in Part II of the IRF. If more than one "AR" is listed, "ARs" should be numbered. If inspection results indicate that corrective measures are warranted, any and all actions taken (along with time, date, and other pertinent information) will be recorded in Part II of the IRF and on all subsequent IRFs until corrective measures are completed. Only after corrective

measures have been completed and recorded on an IRF can an "OK" be entered in the "Condition" column on the IRF.

6.1.2 Inspection Frequency

Inspection frequencies relevant to the open burn units and container storage area addressed in this permit application are specified in Section 6.2 of this plan. Inspection frequencies may be increased at the discretion of the operator or ESH-19, if unexpected malfunctions occur, or if an accelerated deterioration rate of containers or secondary containment systems is detected.

6.1.3 Actions Resulting From Inspections [20 NMAC 4.1, Subpart V, 264.15(c) and 264.171]

6.1.3.1 Preventive Action

If any defects, deterioration, damage, or potential hazards are discovered during inspection, appropriate corrective measures (e.g., transfer of waste from the defective container to an appropriate container in good condition) will be completed promptly to minimize further damage and prevent the need for emergency response. Any preventive action taken in response to an inspection will be noted on the IRF.

6.1.3.2 Remedial and Emergency Action

If a hazardous condition is imminent or has already occurred, remedial action will be taken immediately. The condition will be assessed by the group leader (or designee) responsible for the unit. If this assessment indicates that human health and the environment may be adversely affected, the contingency plan (Section 7.0 of this application) will be implemented immediately. The contingency plan discusses the appropriate responses to emergency situations. Evacuation determinations will be made as outlined in Table 7-4. In the event the contingency plan is needed, any sampling, decontamination, and verification will be conducted as specified in that plan.

6.2 INSPECTION SCHEDULE AND REQUIREMENTS FOR CONTAINER STORAGE AREAS [20 NMAC 4.1, Subpart V, 264.15(b) and 264.174]

The container storage area located in Building 88 at TA-16 will be inspected according to the schedule provided below. Inspection frequencies are adequate based on the deterioration rates of equipment/systems and the probability of harm to human health or the environment if failure of the equipment/systems or any operator error goes undetected between inspections.

6.2.1 Daily Inspection Requirements

Areas subject to spills, such as loading and unloading areas, will be inspected each working day when in use (i.e., when waste is stored at the area). Daily inspection requirements must also be met (1) when containers that have the potential for spills and leaks are moved within the

container storage area and (2) when new containers of waste are placed in the storage area. For the daily inspection, the items in the following blocks on the IRF will be addressed:

Block Number	Item(s)
1-5	General information
7	(Un)loading area
13	Structural integrity of containers
14	Covers/lids of containers
16	Labels
22	Secondary containment structures
23	Appropriate aisle space and stacking
24	Appropriate container segregation
39	Radiation safety
40-48	General information

6.2.2 Weekly Inspection Requirements

Weekly inspection requirements for the container storage area, to be initiated on the first working day of each week, include the items in the following blocks on the IRF:

Block Number	Item(s)
1-5	General information
7	(Un)loading area
8	Communication equipment
11	Porta Berm (if applicable)
12	Eyewashes/safety showers
13	Structural integrity of containers
14	Covers/lids of containers
15	Warning signs
16	Labels
17	Accumulation start date
18	Run on/off control
20	Security
21	Site lighting
22	Secondary containment structures
23	Appropriate aisle space and stacking
24	Appropriate container segregation
25	Hose bibs, water supply (if applicable)

Block Number	Item(s)
27	Road/work surfaces
28	Wind sock (if applicable)
30	Pallets (if applicable)
33	Spill control, fire, and emergency equipment
39	Radiation safety
40-48	General information

6.3 INSPECTION SCHEDULE AND REQUIREMENTS FOR OPEN BURN UNITS [20 NMAC 4.1, Subpart V, 264.15(b) and 264.602]

The five open burn units located at TA-16 will be inspected according to the schedule provided below. Inspection frequencies are adequate based on the deterioration rates of equipment/systems and the probability of harm to human health or the environment if failure of the equipment/systems or any operator error goes undetected between inspections.

6.3.1 Daily Inspection Requirements

Daily inspections will be conducted each day of operation (i.e., every day that waste is in a burn area and/or that waste treatment by open burning occurs). For the daily inspection of the open burn units, the items in the following blocks on the IRF will be addressed:

Block Number	Item(s)
1-5	General information
7	(Un)loading area
8	Communication equipment
13	Structural integrity of containers
14	Covers/lids of containers
16	Labels
18	Run on/off control
22	Secondary containment structures
24	Appropriate container segregation
40-48	General information

6.3.2 Weekly Inspection Requirements

Weekly inspection of the open burn units, to be initiated on the first working day of each week, include the items in the following blocks on the IRF:

Block Number	Item(s)
1-5	General information
7	(Un)loading area
8	Communication equipment
12	Eyewashes/safety showers
15	Warning signs
18	Run on/off control
20	Security
21	Site lighting
22	Secondary containment structures
25	Hose bibs, water supply (if applicable)
27	Road/work surfaces
28	Wind sock
33	Spill control, fire, and emergency equipment
40-48	General information

ATTACHMENT 6-1

Hazardous and Mixed Waste Facility Inspection Record Form (and Instructions for Use)

HAZARDOUS AND MIXED WASTE FACILITY INSPECTION RECORD FORM

[1] FACILITY	[2] ☐ <90 DAY, GENERATOR STORAGE ☐ TREATMENT, STORAGE, DISPOSAL	[3] START DATE	[4] END DATE

[5] ☐ Containers ☐ Landfill ☐ Surface Impoundment ☐ Waste Pile ☐ Thermal Treatment ☐ Chem/Phys/Bio. Treat.

☐ Incinerator ☐ Misc. Unit ☐ Tank ☐ UST ☐ Land Treatment ☐ Underground Inj.

PART I - Enter condition of item inspected (OK or AR*) in column for day inspected.

ITEM	INSPECTED FOR	SUN	MON	TUE	WED	THU	FRI	SAT
[6] NO USE	CHECK IF NO WASTE IS PRESENT							
[7] (UN)LOADING AREA TANKS/CONTAINERS	SPILLS AND DETERIORATION							
[8] COMMUNICATION EQUIPMENT (PHONE/RADIO/ALARMS)	PROPERLY FUNCTIONING							
[9] TANKS (ALL ABOVE GROUND PORTIONS) MONITORING DATA	DISCHARGE CONTROLS CONDITION, LEAKS, LEVEL (6" FREEBOARD), CORROSION							
[10] SURFACE IMPOUNDMENTS AND CONTAINMENT	FREEBOARD (2 ft) SUDDEN DROPS IN LEVEL							
[11] PORTA BERM	LEAKS, CONDITION							
[12] EYE WASH SAFETY SHOWERS	LEAKS, FUNCTIONING							
[13] STRUCTURAL INTEGRITY OF CONTAINERS/TANKS, VALVES, PIPES, AND FLANGES	DETERIORATION AND LEAKS, CORROSION, DAMAGE							
[14] COVER/LID OF CONTAINERS	CLOSED AND SECURED							
[15] WARNING SIGNS	POSTED & READABLE (BILINGUAL)							
[16] LABELS	"HAZARDOUS WASTE" PRESENT ON ALL CONTAINERS/TANKS							
[17] ACCUMULATION START DATE	PRESENT ON ALL CONTAINERS, TANKS, NONE EXCEED TIME RESTRICTIONS							
[18] RUN ON/OFF CONTROL (AREA L, G, H, P) LANDFILLS, DETONATION PADS	INTEGRITY, EROSION, PONDING							
[19] COVER INTEGRITY (AREA L, G, H, P), LANDFILLS	EROSION, SUBSIDENCE, WATER INTRUSION							
[20] SECURITY	CONDITION, FENCE/GATES/LOCKS							
[21] SITE LIGHTING	FUNCTIONS PROPERLY							

Attachment 6-1
Hazardous and Mixed Waste Facility Inspection Record Form

June 16, 1995

HAZARDOUS AND MIXED WASTE FACILITY INSPECTION RECORD FORM

ITEM	INSPECTED FOR	SUN	MON	TUE	WED	THU	FRI	SAT
[22] CONTAINMENT STRUCTURES	INTEGRITY, STANDING WATER, VEGETATION, EROSION							
[23] AISLE SPACE, STACKING	ADEQUACY, APPROPRIATENESS							
[24] MANAGEMENT OF CONTAINERS	SEGREGATED ACCORDING TO COMPATIBILITY							
[25] HOSE BIBS, WATER SUPPLY	LEAKS, FUNCTIONING							
[26] STORAGE SHEDS	FLOOR DAMAGE, LIQUID							
[27] ROAD/WORK SURFACES	CRACKS/POTHOLES							
[28] WIND SOCK	DAMAGE, FUNCTIONING							
[29] SHAFT COVER AND RAIL	PRESENT, DAMAGE							
[30] PALLETS	INTEGRITY, DAMAGE							
[31] TREATMENT TANKS	PROPER OPERATION, LEAKS							
[32] REFRIGERATOR	DAMAGED CONTAINERS, PROPER OPERATION							
[33] SPILL CONTROL, FIRE, AND EMERGENCY EQUIPMENT	PRESENT AND IN GOOD WORKING ORDER							
[34] INCINERATOR EMERGENCY WASTE FEED CUTOFF/ALARMS	PROPER OPERATING CONDITION OF ALL SHUTDOWN CONTROLS							
[35] INCINERATOR PUMPS, VALVES, PIPES, MONITORING CONTROLS	LEAKS/SPILLS/TAMPERING, OPERATING WITHIN SPECS.							
[36] PRESSURE VESSELS (S-SITE)	DETERIORATION AND SAND CONDITION							
[37] OIL BURN PANS (S-SITE)	DETERIORATION & LEAKS							
[38] HE BURN PADS (S-SITE)	DETERIORATION, VEGETATION, SAND COND., EROSION							
[39] RADIATION SAFETY	SIGNS, MONITORING ($\alpha\ \beta\ \gamma\ {}^3H$)							
[40] DATE	DATE OF INSPECTION							
[41] TIME	TIME OF INSPECTION							
[42] INSPECTOR	INITIALS OF INSPECTOR							

HAZARDOUS AND MIXED WASTE FACILITY INSPECTION RECORD FORM

PART II - For any AR (Action Required) in PART I above, describe below: action required, action taken, date of action. Attach additional sheets if necessary.

(Note: Items 43-48 must be completed for all inspections.)

[43] INSPECTOR (Printed Name)	[45] Z NUMBER	[46] GROUP	[47] DATE	[48] TIME
[44] INSPECTOR (Signature)				

Attachment 6-1 (Continued)

Hazardous and Mixed Waste Facility Inspection Record Form

June 16, 1995

Instructions for Use of the Hazardous and Mixed Waste Facility Inspection Record Form

Part I

1. FACILITY: Location information including TA, building, and room if applicable. Other location descriptors may be necessary. (e.g., TA-59-3-114 or TA-59-1-S. Dock)

2. <90 Day, GENERATOR STORAGE should be checked if this location is intended for operation in accordance with generator requirements for storage of hazardous waste for less than 90 days.

   TREATMENT, STORAGE, DISPOSAL should be checked if this location is listed in LANL's Hazardous Waste Facility Permit or Part A application as a permitted or interim status TSD operation.

3. START DATE: The date of the first inspection for the week on that inspection sheet. (Usually the first working day of the week)

4. END DATE: The date of the last inspection for the week on that inspection sheet. (Usually the last working day of the week, however, if handling of hazardous waste occurs during the weekend inspections must be conducted.)

5. Check the appropriate box for the type of operation. Several boxes may be checked if necessary for those locations where inspections are combined on a single sheet. You must have prior approval from ESH-19 to combine inspections for more than one unit.

6. NO USE: May be checked if the unit did not store, treat, dispose, or otherwise handle hazardous waste for the day/week in question. The individual responsible for the inspection must then only complete boxes 39, 40, 41, 42, 43, 44, 45, 46, 47, and 48 for that day/week. If any hazardous waste is subsequently placed at the site for any reason, a full inspection must be performed immediately and every working day thereafter until all waste is properly disposed of.

7. Loading and unloading areas must be inspected daily when in use for signs of damage or deterioration that may lead to an accident or spill. This includes asphalt pads and areas where containers or tanks are handled or contents thereof are transferred.

8. Communication equipment must be inspected for proper function: Includes all telephones, two-way radios, and alarms for the area being inspected. (An initial consultation with ESH-19 prior to use of the facility/location will determine what equipment is necessary at any particular location.)

9. For tank systems used for treatment or storage of hazardous waste, all aboveground portions of the tank system, including any and all ancillary plumbing, must be inspected daily for signs of leaking, corrosion, deterioration, or improper operation. Tanks must be operated with a minimum freeboard of 6 inches. If the tank system includes discharge controls, overtopping controls, tank level alarms, or other monitoring equipment, including leak detection equipment, all controls and relevant data must be checked to ensure they are operating properly and that operation is within design specifications for the system.

10. Surface impoundments must be operated with a minimum of 24 inches (60 cm) of freeboard from the top of the dike or berm to the surface of the waste therein. Inspectors must look for signs of leaks, deterioration, and erosion of dikes and berms, and any associated plumbing or valves. These could include dying vegetation, gullies, and sudden changes in level.

Instructions for Use of the Hazardous and Mixed Waste Facility Inspection Record Form (Continued)

11. For those locations where inflatable "Porta Berms" are used as secondary containment for tanks and containers of hazardous waste, inspectors must ensure that they are adequately inflated. Inspectors must also check for the presence of liquids in the containment unit which could indicate leaks or spills of hazardous waste. All monitoring and leak detection systems must also be checked.

12. Where required, eyewash and safety showers must be inspected to ensure proper operating condition. Outside locations must be checked for freezing.

13. All containers and tanks must be checked for structural integrity, leaks, corrosion, or damage. This item includes checking condition of all construction materials, fixtures, seams, and auxiliary equipment. See Item 9 above.

14. All tanks and containers used for treating or storing hazardous waste must have the cover or lid securely in place. Containers are not considered to be closed until the lid/cover is fastened in the manner the manufacturer originally intended.

15. Required signs must be readable and prominently posted. TSD facilities and <90 day storage areas must be equipped with bilingual (English/Spanish) signs with the legend "DANGER UNAUTHORIZED PERSONNEL KEEP OUT." TSDs must be identified with signs that read "HAZARDOUS WASTE STORAGE AREA." <90 day storage areas must be identified with a sign with the legend "<90 DAY HAZARDOUS WASTE STORAGE AREA."

16. All containers and tanks must be labeled with the words "HAZARDOUS WASTE" and with other words that identify the contents. Mixed waste must also be labeled as "RADIOACTIVE."

17. All containers and tanks of hazardous waste in TSDs or <90 day storage areas must be marked with the accumulation start date. At TSDs, containers without dates must be dated when they arrive at the facility. At <90 day storage areas and TSDs, containers must be marked with the accumulation start date at the time the container first receives any waste. For <90 day storage areas, no containers may exceed 90 days from accumulation start date to the time they are delivered to a permitted treatment, storage, or disposal unit. Waste management organizations will provide transportation for these wastes.

18. Landfills and detonation pads must have run-on and runoff controls inspected wherever present. Leachate collection systems, where present, must also be inspected. Items to be inspected for are proper operating condition, damage, erosion, contaminant migration, ponding, etc. Detonation pads must be inspected for unburned or undetonated explosives, ordnance, and debris.

19. Landfill covers must be inspected at least weekly and after storms for evidence of erosion, subsidence, and water intrusion.

20. Site security must be verified. Items such as fences, gates, locks, etc., should be checked for proper condition and adequacy.

21. Site lighting must be adequate to prevent accidents related to hazardous waste operations and for any other night operations that may take place within the boundaries of the hazardous waste unit.

Instructions for Use of the Hazardous and Mixed Waste Facility Inspection Record Form (Continued)

22. Secondary containment structures for hazardous waste operations must be inspected to verify proper operating condition and to ensure adequate capacity. Structures must also be inspected for the presence of standing water or hazardous waste. For incinerators and certain operations at TA-55, secondary containment includes inspections of gloves and gloveboxes, hoods, and ventilation systems where necessary.

23. Adequate aisle space must be maintained to allow for inspection and for the unobstructed movement of personnel and emergency equipment in an emergency. All containers of hazardous waste must be stored in a manner that ensures a minimum of 2 feet of aisle space between containers. Drums containing free liquids or those holding hazardous waste (excluding mixed wastes) may not be stacked over two drums high.

24. All hazardous waste containers holding materials that may be incompatible with any other materials at that location must be separated from those materials by dikes, berms, or other physical barriers to prevent a possible reaction.

25. TSD facilities must have water at an adequate volume and pressure for fire protection available. Hose bibs should be inspected for proper operating condition and adequate pressure. Outside water supplies must be checked for freezing.

26. The storage sheds must be inspected for damage, free liquids that might indicate a leak, and chemical compatibility of materials stored therein.

27. Road and work surfaces, process floors, or other work surfaces at TSDs must be inspected for damage or erosion that could lead to a spill or accident, and for adequate secondary containment.

28. Wind socks, where required, at TSDs must be inspected to ensure that they are present and in proper operating condition.

29. Disposal shafts and shafts used for retrievable storage should have their covers securely in place and guard rails must be installed and in good condition.

30. Hazardous waste containers at TSDs and <90 day storage areas must be stored on pallets if they are stored outside without a roof.

31. Hazardous waste treatment tanks must be operated within design specifications and in accordance with SOPs and Work Plans. Tanks must be inspected for leaks or damage prior to operation.

32. Refrigerators used for storing hazardous waste, or samples thereof, must be inspected for proper operating condition and leaking or damaged containers.

33. Hazardous waste TSDs and <90 day storage areas must have adequate fire and spill control equipment for the types and volumes of waste present. Equipment must be present, in good working order, and appropriate for the material in question.

34. Incinerator waste feed cutoffs, emergency shutdown controls, and associated alarms or warning systems must be inspected for proper operating condition.

35. Incinerators, ancillary plumbing and equipment, and all monitoring controls must be inspected to ensure that they are in proper operating condition, and are being operated within design specifications. Inspectors must also look for evidence of leaks, corrosion, spills, or tampering.

Instructions for Use of the Hazardous and Mixed Waste Facility Inspection Record Form (Continued)

36. Pressure vessels must be inspected for signs of deterioration or damage. Condition of the sand and loading must also be checked to ensure adequacy.

37. Oil burn pans must be inspected for deterioration, damage, or leaks. Inspectors must also inspect for unburned explosives and debris.

38. HE burn pads must be inspected for deterioration, damage, leaks, or vegetation that could catch fire. Condition of the sand must also be checked. Inspectors must also inspect for unburned explosives and debris.

39. Radioactive materials must be properly placarded, labeled, and stored within controlled areas in accordance with AR 3-7. Containers should be monitored/swiped for outside contamination if suspected, and all leaks or spills must be monitored to ensure adequate cleanup.

40. Inspectors will record the date of the current inspection.

41. Inspectors will record the time of the current inspection.

42. Inspectors will initial each daily inspection.

Part II

Inspectors must explain in detail any deficiency noted above. Items to be included are: type of problem, any action taken, and the date/time of the action. Additional sheets may be attached as necessary.

43. Printed name of individual performing inspection.

44. Signature of individual performing inspection.

45. Z number of individual performing inspection.

46. Organization responsible for this location.

47. Date record was signed and completed.

48. Time record was signed and completed.

(Note: Items 43-48 must be completed for all inspections.)

7.0 CONTINGENCY PLAN

This section presents contingency measures for hazardous and mixed waste units at Los Alamos National Laboratory (LANL). The contingency plan is intended to meet the requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart V, Subpart D, "Contingency Plan and Emergency Procedures," and Part B permit application requirements in 20 NMAC 4.1, Subpart IX, 270.14(b)(7), for Resource Conservation and Recovery Act (RCRA) treatment, storage, or disposal (TSD) facilities. In addition, this document is consistent with the LANL Emergency Management Plan (EMP) (LANL, 1993c), prepared by the LANL Emergency Management and Response (EM&R) Office. The provisions of this plan will be carried out immediately to minimize hazards whenever there is a fire, explosion, or release of hazardous or mixed waste or hazardous or mixed waste constituents that could threaten human health or the environment [20 NMAC 4.1, Subpart V, 264.51(b)].

Personnel in the Engineering Sciences and Applications (ESA) and the Dynamic Experimentation (DX) Divisions are trained to safely handle and dispose of highly reactive materials (e.g., high-explosives). Any spill or uncontrolled release of material at the burning ground will be cleaned by personnel from these divisions following the appropriate standard operating procedures.

7.1 HAZARDOUS AND MIXED WASTE EMERGENCY RESPONSE RESOURCES [20 NMAC 4.1, Subpart V, 264.52(c) and 264.53]

The primary resources for management of emergency incidents at LANL reside within the EM&R Office, which is part of the Facilities, Security, and Safeguards (FSS) Division. During an emergency situation, line management (i.e., the Group Leader of the affected area) works with the duty Emergency Manager from the EM&R Office (FSS-20). The Emergency Manager has primary responsibility for managing emergency response operations, making appropriate notifications, activating the emergency response organizations, and proceeding to the scene. The Emergency Manager has authority to assume the role of Incident Commander (IC) during an emergency and assumes full responsibility for management of the emergency response operations at the scene. Additional resources include personnel from the Environment, Safety, and Health (ESH) and the Chemical Science and Technology (CST) Divisions at LANL.

Contracted services and other agencies are also available for assistance during emergencies. These include the contracted services of Protection Technology Los Alamos (PTLA) for security, Johnson Controls World Services Inc. (JCI) for facility maintenance, and the Los Alamos County

Fire Department (LACFD). The Los Alamos County Police Department (LACPD) provides assistance under a Memorandum of Understanding (MOU). The Los Alamos Medical Center (LAMC) provides assistance under a Planning Agreement.

The IC coordinates all groups and agencies responding to the emergency and personnel operating at the scene. The emergency notification procedure is illustrated on Figure 7-1. The responsibilities and/or assistance available from the response groups/agencies are listed in Table 7-1 and discussed briefly in Sections 7.1.2 through 7.1.7. Each of the emergency response groups/agencies and the facility operators will retain a current copy of this contingency plan. The Hazardous and Solid Waste Group (ESH-19) is responsible for the controlled distribution of the contingency plan.

7.1.1 Emergency Management and Response Office [20 NMAC 4.1, Subpart V, 264.52(d) and 264.55]

The Director of LANL has delegated the authority and responsibility for administering and implementing LANL's emergency management program to the FSS Division, which includes the EM&R Office (FSS-20). The EM&R Office coordinates and issues LANL's EMP and provides response coordination for emergencies. The EM&R Office also provides a 24-hour duty Emergency Manager to respond to emergencies, including hazardous and mixed waste releases. The LANL Emergency Manager is the functional equivalent of the RCRA Emergency Coordinator (20 NMAC 4.1, Subpart V, 264.55). The EM&R Office maintains an Emergency Operations Center (EOC) in a ready condition should a center be required. The primary EOC is located at TA-59, Building 1 (TA-59-1). An alternate EOC is located at TA-49-113.

EM&R Office personnel designated as Emergency Managers are listed in Table 7-2. Assignment as the duty (i.e., primary) Emergency Manager is rotated. The duty Emergency Manager can be reached by contacting the EM&R Office (667-6211 during working hours, 667-7080 after working hours) or the Central Alarm Station (CAS) operator (911).

The duty Emergency Manager will respond to emergency incidents involving the release of hazardous or mixed waste to the environment, including spills, fires, and explosions. With input from the appropriate ESH, CST, and site groups, the duty Emergency Manager will initially assess the possible hazards to human health or the environment and will use whatever response group(s) and/or emergency equipment necessary in order to control and contain the waste. In the event of an emergency, the Emergency Manager becomes the IC with full responsibility for field activities (including logistics, planning, and operations or establishing these positions within the Incident Control Group [ICG]). At the scene of the emergency, the IC

will assemble an ICG consisting of the senior person from each responding organization, functional specialists, and the duty Emergency Manager. Additional technical or management representation may be integrated into the emergency response, as needed. The ICG will receive direction from the IC. The members of the ICG will work together to mitigate emergency situations.

The duty Emergency Manager responding to an emergency will have access to a copy of the appropriate building emergency plan(s) (BEP) relating to the area in which the incident is occurring. These plans are maintained by the EM&R Office at TA-59. From the BEP(s) and other site-specific information, the ICG will then supply the various response groups with specific information relating to the facilities involved (including the layout of all affected buildings; the location of evacuation routes, equipment, and personnel; properties of the materials/wastes managed at the facility; and the hazards associated with these materials/wastes).

7.1.2 Hazardous Materials Response Group

The Hazardous Materials (HAZMAT) Team is comprised of personnel from the Hazardous Materials Response Group (ESH-10). The HAZMAT Team is responsible for the aggressive mitigation of chemical, radiological, hazardous waste, and mixed waste emergencies, including field decontamination of responders and response equipment. The HAZMAT Team may provide the LACFD with limited field decontamination support for victims. The HAZMAT Team is capable of providing a contamination-control station at the scene of a hazardous material incident to process people working in a contaminated area and is prepared to perform decontamination of personnel. LANL standards require that the HAZMAT Team meet the training criteria for emergency response personnel specified in the Code of Federal Regulations, Title 29 (29 CFR), Subparts 1910.120(q)(6)(iii), (iv), and (v). The HAZMAT Team is part of the ICG reporting through the Hazardous Materials Group Supervisor (HMGS). The LANL HMGS coordinates or arranges for any additional ESH personnel and resources that may be required for LANL or LANL-related emergencies and coordinates the HAZMAT Team and radiological field monitoring activities.

During an emergency response, ESH-10 also provides site field monitoring to determine the nature and extent of contamination, provides information on correct handling of chemicals, makes recommendations on protective clothing and equipment, and provides exposure and treatment information to responders. To operate effectively, ESH-10 may obtain resources from other ESH groups, such as the Health Physics Operations Group (ESH-1) and the Industrial Hygiene and Safety Group (ESH-5).

7.1.3 CST and ESH Response Groups

At the scene, the IC coordinates representatives and technical advisors from groups within the CST and ESH Divisions. In addition to their post-emergency duties, the groups discussed below are responsible for on-scene emergency operations such as planning. The Environmental Management Advisor will provide technical support and ensure LANL compliance with federal, state, and local regulations.

7.1.3.1 Chemical Science and Technology Division

Waste management groups within CST Division are responsible for initial response actions at hazardous and mixed waste treatment and storage units at TA-21, TA-50, and TA-54. These groups also provide guidance on proper treatment, storage, and transportation of hazardous and mixed waste received from units at LANL, including residue from TA-16 open burn units.

7.1.3.2 Air Quality Group

The Air Quality Group (ESH-17) provides field surveys of air to determine environmental effects of exposure after an emergency. In addition, ESH-17 provides expertise in meteorology to establish short- and long-term environmental effects of emergency conditions.

7.1.3.3 Water Quality and Hydrology Group

After an emergency, the Water Quality and Hydrology Group (ESH-18) provides field surveys of water to determine environmental effects of exposure. ESH-18 also provides expertise in hydrogeology to establish short- and long-term environmental effects of emergency conditions.

7.1.3.4 Hazardous and Solid Waste Group

ESH-19 provides guidance on regulatory requirements to other groups. After an emergency, ESH-19 provides field surveys (e.g., of soil) to determine environmental effects of exposure.

7.1.3.5 Environmental Assessments and Resource Evaluations Group

The Environmental Assessments and Resource Evaluations Group (ESH-20) provides field surveys of biota to determine environmental effects of exposure after an emergency.

7.1.4 Other LANL Response Resources

Personnel from the Nuclear Materials Technology (NMT) Division have been trained in emergency procedures. If an emergency occurs at TA-55, NMT personnel are responsible for monitoring for leaks, pressure buildup, gas generation, and/or equipment ruptures.

7.1.5 Contracted Response Groups

Contracted response groups report to the Crisis Manager in the ICG if the EOC is activated (in a smaller emergency, the EOC is not activated). They report directly to the IC in the event of a

smaller emergency. If the IC deems it necessary, the IC may designate an Operations Officer to aid in the coordination and direction of these groups.

7.1.5.1 Protection Technology Los Alamos

PTLA is responsible for LANL security, which is provided by PTLA under contract to LANL. During an emergency, PTLA activities include maintaining security, directing traffic within LANL, and controlling access to the emergency scene. PTLA maintains the necessary equipment (such as crowd-control equipment and patrol vehicles) to perform these functions. In addition, the CAS at TA-64-1 is manned by PTLA personnel 24 hours a day.

7.1.5.2 Johnson Controls World Services Inc.

JCI provides a maintenance support force under contract to LANL. This support force is under LANL's direction in an emergency. JCI conducts inspections of LANL equipment, maintains equipment, and participates in post-emergency cleanup under the direction of a Recovery Manager designated by the IC. The Utilities Control Center (UCC) at TA-3-223 is maintained by JCI personnel 24 hours a day.

7.1.5.3 Los Alamos County Fire Department

The LACFD provides fire protection and ambulance coverage for the residential communities of Los Alamos and White Rock and for LANL. In the case of an emergency within LANL, the LACFD coordinates fire suppression and Emergency Medical Technician efforts, while the IC retains overall responsibility for the emergency response effort. The U.S. Department of Energy (DOE) requires that LACFD personnel meet the training criteria for emergency response personnel specified in 29 CFR 1910.120(q)(6)(i) and (ii). A copy of the contract between the DOE and the Incorporated County of Los Alamos is provided as Appendix K.

7.1.6 LANL Support Groups

7.1.6.1 Health Physics Operations Group

ESH-1 provides field personnel to perform routine site evaluation and monitoring to determine the nature and extent of radiological contamination. ESH-1 also provides routine guidance on radiological decontamination. Field personnel conduct these activities under the supervision of certified health physicists. In addition, this group augments the assessment and monitoring functions of the HAZMAT Team.

7.1.6.2 Occupational Medicine Group

LANL maintains its own medical facility operated by the Occupational Medicine Group (ESH-2). ESH-2 provides appropriate medical treatment for occupation-related illnesses and injuries and monitors employees to assess the effectiveness of health protection programs. In addition to promoting early identification and prevention of illnesses or injuries that may arise from

exposures to hazardous or radioactive materials, ESH-2 maintains documented records of the health status of employees and related occupational medicine activities.

Although ESH-2 is not routinely involved with on-scene emergency response, the group maintains a central medical facility with a fully equipped emergency room and decontamination facilities at TA-3, Building 409 (SM-409). Additionally, this group staffs three satellite first-aid stations at TA-16, TA-53, and TA-55. The locations of these emergency facilities are shown on Figure 7-2. Medical staff includes physicians, physician's assistants, registered nurses, x-ray technicians, and clinical laboratory technicians. All full-time physicians and nurses receive radiation accident training.

ESH-2 maintains access to a software program called the TOMES system at the central medical facility in SM-409. This extensive database provides the clinical staff with timely exposure and treatment information. ESH-2 is supported by the ESH-5 Group, as described below.

7.1.6.3 Industrial Hygiene and Safety Group

ESH-5 provides support to ESH-2 with its ability to obtain additional exposure and treatment information via telephone access to the National Library of Medicine's TOXLINE and CHEMLINE, the Toxicity Databank files POISONDEX and TOMESPLUS (Micromedics), and the CC/INFO database files on material safety data sheets. In addition, ESH-5 maintains access to the National Institute of Occupational Safety and Health Technical Information Center and the Registry of Toxic Effects of Chemical Substances. During routine operations, ESH-5 performs site evaluations and field testing to determine the nature and extent of chemical contamination and specifies protective clothing and equipment.

7.1.6.4 Occurrence Investigation Group

The Occurrence Investigation Group (ESH-7) is responsible for the Occurrences Reporting and Processing System at LANL and has the lead in reporting the occurrence of an on-site emergency. ESH-7 is in part responsible for tracking follow-up corrective actions. ESH-7 personnel assist the facility manager in investigating the occurrence, determining the causal factors, identifying the appropriate corrective actions, and assisting in the preparation of reports documenting the occurrence to DOE. This group tracks the target and actual completion dates for all corrective actions associated with an emergency and maintains the information in an on-site database.

7.1.7 Outside Response Agencies

During an emergency, outside response agencies report directly to the IC. The IC may designate an Operations Officer to aid in coordinating and directing the groups responding to an emergency.

7.1.7.1 Los Alamos County Police Department

The LACPD has only minimal interaction with LANL in an on-site emergency. This interaction is limited to traffic control on DOE roads with public access and to criminal investigations. A copy of the MOU between the DOE and the Incorporated County of Los Alamos for mutual aid assistance is included as Appendix L.

7.1.7.2 Los Alamos Medical Center

LANL maintains a fully equipped decontamination room adjacent to the emergency room at LAMC. In the event that a case is sent to LAMC, support for the emergency room staff is provided by ESH-2 medical personnel. ESH-1, ESH-5, and ESH-10 personnel also provide assistance to the emergency room staff. This assistance is coordinated through the EM&R Office. A copy of the Planning Agreement between the DOE Los Alamos Area Office (DOE/LAAO) and LAMC is included as Appendix M.

7.2 EMERGENCY EQUIPMENT AND COMMUNICATIONS [20 NMAC 4.1, Subpart V, 264.52(e)]

7.2.1 Emergency Equipment

20 NMAC 4.1, Subpart V, Subpart D, requires a listing of all emergency response equipment available that can be used in the event of an emergency. Attachment 7-1 lists all emergency equipment available at the open burn units and container storage area addressed in this permit application. Attachment 7-1 includes supplemental emergency equipment maintained by JCI, the LACFD, and ESH-2 as well. The locations of emergency facilities are shown on Figure 7-2.

7.2.2 Emergency Communications [20 NMAC 4.1, Subpart V, 264.56(a)]

Effective emergency response at LANL requires an efficient communication system that will integrate required personnel into the emergency response. The initial phase of an emergency will involve a small number of individuals at the affected area and notification of the duty Emergency Manager. When responding to hazardous or mixed waste emergencies, the EM&R Office provides communications between response units and emergency organizations.

7.2.2.1 Emergency Central Alarm Station

The emergency CAS is located at TA-64-1. This station is manned by PTLA personnel 24 hours a day and is equipped with telephones (including direct-line telephones), medium- and short-range radios, a National Warning System (NAWAS) station, and an emergency power system.

The fire alarm board at the control room gives the location of automatic and manual fire alarm equipment. The CAS receives alarms from several sources and, in turn, notifies the duty Emergency Manager of a hazardous or mixed waste emergency. Sources include:

- Telephone communication (911)
- Automatic fire alarms
- Manual pull alarms
- Computer interface (to warn of critical events at selected facilities)
- Security alarms
- Radio communications.

Upon receipt of an alarm, the CAS operator then notifies the LACFD and the duty Emergency Manager. The Emergency Manager, the HMGS, the EOC communicator, and/or the CAS operator may request emergency response groups to respond. Should the LANL 911 system fail, the Los Alamos County System, located at the LACPD Station, will be used to activate emergency response groups.

7.2.2.2 Utilities Control Center

JCI personnel maintain the UCC at TA-3-223 24 hours a day. Alarms at this facility are connected to LANL experiments, equipment, and/or buildings to record outages and hazardous conditions. Any conditions that activate these alarms will be reported immediately to building management or to the CAS operator for notification and response.

7.2.2.3 Additional Communication Systems

Internal communication systems at LANL include:

- The Centrex telephone system
- A telephone paging system
- A variety of FM VHF simplex repeater and trunked radio systems, including:
  - Multiple base stations
  - Mobile and hand-held units
  - Links to New Mexico public safety agencies
- A UHF radio system, including:
  - Multiple antenna sites
  - Mobile and base units
  - Links with the LACPD, LACFD, and the State Medical System
- A 400-megahertz trunked radio system that includes a link with the LACFD
- Transmission and reception (through EOC) for:
  - Secure telephone
  - Secure fax
  - Secure still video
- Access to all radio systems outlined above (through EOC).

Off-site communications with federal, state, tribal, county, and other agencies are available through the following:

- A Centrex telephone system
- Private telephone lines (if Centrex fails)
- Two NAWAS
- A link to KRSN radio (local radio station)
- The local cable television
- A Community Alert Network.

The LANL EOC, maintained by the EM&R Office, operates radio systems on key LANL and off-site channels. Emergency personnel responding to on-site incidents have the benefit of wide-area radio coverage using EOC facilities. After hours, the duty Emergency Manager is responsible for activating whatever support personnel, equipment, or services are needed.

7.3 CONTINGENCY PLAN IMPLEMENTATION [20 NMAC 4.1, Subpart V, 264.56]

Section 7.3.1 defines the guidelines used to initiate this contingency plan and the resulting actions taken.

7.3.1 Guidelines For Implementation [20 NMAC 4.1, Subpart V, 264.51(b) and 264.56]

The decision to implement this contingency plan depends upon whether an imminent or actual incident involving a release of hazardous or mixed waste to the environment could threaten human health or the environment. The duty Emergency Manager will use the guidelines listed below to decide whether to implement this plan.

This contingency plan will be implemented immediately in the following situations involving releases or potential releases of hazardous or mixed waste:

- Spills:
  - If a hazardous or mixed waste spill cannot be contained with secondary containment or application of sorbents.
  - If precipitation threatens to move spilled material off site.
  - If a hazardous or mixed waste spill causes the release of flammable material, creating a fire or explosion hazard.
  - If a hazardous or mixed waste spill results in toxic fumes that threaten human health.
  - If an earthquake or other natural disaster threatens containment integrity.
- Explosions:
  - If an unplanned explosion involving hazardous or mixed waste occurs.
  - If an imminent danger of an explosion involving hazardous or mixed waste exists.

- Fires:
  - If an unexpected fire involving hazardous or mixed waste occurs.
  - If any building, grass, forest, or nonhazardous waste fire exists that threatens to volatilize or ignite hazardous or mixed waste.

7.3.2 Emergency Notification [20 NMAC 4.1, Subpart V, 264.56(a) and (b)]

During working hours, immediately upon discovery of an imminent or actual incident involving hazardous or mixed waste, on-site personnel will notify line management and the EM&R Office. During nonworking hours, personnel will report all incidents involving hazardous or mixed waste to the duty Emergency Manager or the CAS operator. In the case of fire involving hazardous or mixed waste, notification of these individuals is superseded by the LANL fire alarm system. A fire is reported by dialing 911 (from telephone exchanges 667 and 665) or 667-7080 (from all exchanges), activating automatic alarms, or activating a fire pull box. All fire alarms alert the CAS operator, the LACFD, and PTLA. In case of a fire involving hazardous or mixed waste or a hazardous or mixed waste unit, the CAS operator will contact the duty Emergency Manager.

Upon recognition of a hazardous or mixed waste emergency, the first arriving emergency-trained person will become the temporary IC. Once the EM&R Office is notified of the emergency, the duty Emergency Manager will proceed to the scene and be briefed by the temporary IC, building/area personnel, and/or other emergency units/teams. The Emergency Manager will then assume the position of IC. If necessary, the IC may recommend that the EOC be activated and that the necessary members of the emergency management team be determined. The IC will form an ICG and contact the HMGS. The HMGS will notify the appropriate emergency response groups. The IC may determine from the list of response groups described in Table 7-1 which groups to contact in an emergency. Each response group maintains an on-call person and/or a call-down procedure to respond to emergencies. The EM&R Office will be notified of any potential hazardous or mixed waste emergency (e.g., spills, fires, explosions). The IC and the HMGS will use whatever means are available (including the assistance of other response groups, computer data searches, and sampling) to determine if a hazardous or mixed waste is being or has been generated and/or released. ESH-10, ESH-19, and waste management groups within CST Division have the expertise to determine the nature and extent of contamination and the characteristics of the hazardous or mixed waste involved.

7.3.3 Emergency Manager Actions [20 NMAC 4.1, Subpart V, 264.56 (b-h)]

Upon notification of an incident, the duty Emergency Manager may:

- Proceed directly to the scene.

- Call the HMGS.
- Assess the nature of the incident (e.g., through communication with the temporary IC).
- Assume incident command.
- Make an initial assessment of the incident and, in conjunction with the ICG, obtain resources to determine the source, quantities, and types of hazardous or mixed waste involved and the areal extent of any released materials.
- Based on the guidelines in Section 7.3.1 of this plan, determine if implementation of this contingency plan is warranted.
- Recommend activation of the EOC, if necessary.

Upon deciding to implement this contingency plan, the IC will, when appropriate:

- Assess the hazards to human health and the environment, including both direct and indirect effects, such as generation of toxic, irritating, or asphyxiating gases and/or hazards of runoff of water or chemicals used for fire suppression. An individual designated by the IC will use the guidelines in Section 7.3.1 to assess the hazards to human health and the environment. If any of the criteria under Section 7.3.1 are met and if the responsible Group or Section Leader has not already accomplished evacuation of the area, the IC will initiate evacuation of the immediate area.
- Determine if evacuation of the local area is advisable and, if so, immediately notify appropriate response groups and the LACPD, if appropriate. The IC may activate one or more of the following community alert mechanisms: the Community Alert (telephone) Network, the KRSN radio remote input system, or the cable TV capture system.
- Notify required response personnel and DOE/LAAO. In the case of fire, the IC will confirm that the LACFD Senior Officer at the scene is aware of the special hazards associated with hazardous or mixed waste.
- Warn the remaining on-scene and response personnel of imminent or actual hazards using internal radio communication systems or the public address (PA) system. A radio/PA system at key facilities throughout LANL may be used for emergency notification.
- In emergency situations, the appropriate ESH representative will notify the New Mexico Environment Department (NMED) at (505) 827-9329 and the National Response Center at (800) 424-8802, reporting:
  - The name and telephone number of the ESH representative
  - The name and address of the facility
  - The time and type of incident
  - The name and quantity of material involved, to the extent known
  - The extent of injuries, if any
  - The possible hazards to human health or the environment outside the facility.
- Advise the response groups of hazards in order to minimize personnel exposure and expedite mitigation.
- When an emergency occurs at hazardous or mixed waste treatment units, ensure that CST waste management personnel or, in the case of TA-55, the NMT emergency response personnel monitor for leaks, pressure buildup, gas generation, or equipment ruptures.

Once control of the emergency is established, the IC will take all reasonable measures to minimize the occurrence, recurrence, or spread of fires, explosions, or releases. In addition, the IC will delegate cleanup and decontamination responsibilities to include:

- Arranging for site cleanup.
- Providing for proper handling of recovered waste, contaminated soil, or contaminated surface/ground water.
- Providing for decontamination of equipment, as needed.
- Arranging for replacement and/or repair of equipment, as needed.
- Ensuring that testing is conducted to verify successful cleanup.

Within 15 days of the incident, DOE/LAAO will submit a report to the Secretary of NMED. The contents of this report are generated by several LANL groups responding to the emergency, as detailed in Section 7.12.

7.4 SPILLS [20 NMAC 4.1, Subpart V, 264.56(e)]

Sudden releases include spills of hazardous or mixed waste that pose a significant threat to human health or the environment. Spill incidents resulting in a sudden release of hazardous or mixed waste that present a potential threat to human health or the environment, as listed in Section 7.3.1, require implementation of this contingency plan.

Hazardous and mixed wastes are stored on site in a variety of containers including, but not limited to, 55-gallon drums, lab packs, tanks, and small laboratory bottles. Volumes of hazardous or mixed waste stored or treated will vary from unit to unit. The general steps in handling hazardous and/or mixed waste spills are as follows:

- Isolate the immediate area and deny entry to all unauthorized personnel
- Contain the spill by spreading sorbents or forming temporary dikes to prevent further migration (performed by properly trained personnel, if safe)
- Monitor the spill area and sample the spilled waste and contaminated media
- Package the waste and contaminated media in sound containers
- Decontaminate the area and all involved equipment and personnel (follow by testing to assure adequate cleanup)
- Remove the waste and contaminated media (performed by CST waste management personnel).

The IC will determine the steps to be taken for spill mitigation. If initial mitigation of the spill is necessary and can be accomplished safely before the Emergency Manager arrives, a qualified member of the affected area's operating group will serve as the temporary IC.

The emergency preparedness procedures related to flammable organic solvent spills require stabilization of the spilled material with an organic solvent spill kit. Other chemical spills are to be stabilized using acid and caustic spill kits or by the addition of sorbents. During spill control and cleanup, all personnel will wear personal protective equipment (PPE). ESH-5 will conduct monitoring to ensure that chemical exposure is minimized. ESH-1 will conduct health physics monitoring whenever mixed waste is involved to ensure that radiation exposure is also minimized. The stabilized material may be treated as hazardous or mixed waste, depending on the components present. Runoff from spills of listed hazardous or mixed waste that have migrated outside waste storage and/or treatment areas must be contained and managed as hazardous or mixed waste, as appropriate. If the spill was from a characteristic hazardous or mixed waste and if analysis shows that the runoff does not exhibit the characteristic (i.e., ignitability, corrosivity, reactivity, and/or toxicity), then the runoff need not be managed as characteristic waste. Temporary dikes may be constructed to contain runoff.

7.4.1 Spill Control Procedures

When a flammable organic solvent spill, a highly acidic spill, or a highly caustic spill has been stabilized with the contents of an organic solvent spill kit, an acid spill kit, or a caustic spill kit, respectively, the resulting material may be sorbed using a nonbiodegradable sorbent. Nonbiodegradable sorbent can be used to control spills if it is known to be compatible with the spilled material. Approved drums or packaging will be used to collect all spilled material and contaminated sorbent. For corrosives, the drums will be lined with polyethylene drum liners. Attachment 7-1 lists emergency equipment available for spill control at TA-16-88 and the TA-16 open burn units addressed in this permit application. CST waste management groups will determine the ultimate disposition of any contaminated sorbent or waste material according to RCRA regulatory requirements.

7.4.2 Decontamination Verification

Decontamination will be accomplished at the spill site. After the spilled material has been sorbed, the material will be containerized. If the spill occurs on a cemented or asphaltic concrete area, water or an appropriate solvent will be used to clean the area. Liquids (i.e., spilled material and cleaning water or solvents used to clean a spill) will be sorbed with a compatible, nonbiodegradable sorbent and will be containerized. If a spill is from an identifiable source, then the spilled material will be analyzed for the hazardous waste constituents known to

be components of the waste managed at that unit. The appropriate analytical method(s) given in Table 7-3 will be utilized. If the spill is from other than an identifiable source, then the spilled material will be analyzed for all of the parameters listed in Table 7-3. All personnel conducting decontamination verification will wear PPE. ESH-1 will conduct health physics monitoring whenever mixed waste is involved to ensure that radiation exposure is minimized. Any hazardous or mixed waste collected from decontamination activities will be handled appropriately.

In order to establish baseline data, a sample of decontamination water or solvent and nonbiodegradable sorbent material will be taken prior to the start of the decontamination effort. A sample of the material used to sorb the final wash water will then be taken. No hazardous waste constituents should be present in this sample at levels above those found in the baseline data. If the sample exhibits any of the characteristics of a hazardous waste as defined in 20 NMAC 4.1, Subpart II, Subpart C, or if a hazardous constituent listed in 20 NMAC 4.1, Subpart II, Appendix VIII (and not detected in the baseline data) is present above established health-based levels, the decontamination procedure will be repeated. An alternative demonstration of decontamination may be proposed and justified to NMED, who will evaluate the proposed alternative in accordance with the standards and guidance then in effect. If the proposed alternative is accepted, decontamination levels will meet the levels approved by NMED. Each sample will be collected with an appropriate sampling device (e.g., thief or trier) as specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1992a), Final Updates I and II (EPA, 1995), and subsequent updates, as applicable.

If the spill occurs on soil, any free liquid present will be sorbed with a compatible nonbiodegradable sorbent, and the resulting material will be containerized. For such a spill, all contaminated soil will be excavated and containerized. ESH-5 will conduct industrial hygiene monitoring, and if mixed waste is involved, ESH-1 will conduct health physics monitoring to minimize exposure during soil removal operations. To establish comparative background data, one or more samples will be collected from an unaffected area near the spill site. The spill site will then be characterized, and the data will be compared to the background data to ensure that all contaminated material has been removed.

If a spill occurs in an area with sealed floors, verification sampling will be performed after decontamination. Swipe samples or other types of sampling appropriate for the contaminant will be collected at random in the area and analyzed. For a spill that occurs in an area that does not have sealed floors, random samples of the floor material, such as concrete chips, will be collected and analyzed for decontamination verification. Contaminated floor material will be

removed if the level of contamination remains above that detected in the background data after repeated decontamination attempts. If a spill occurs on asphaltic concrete, the asphaltic concrete will be decontaminated, and a sample of the final wash water and/or the material used to sorb the final wash water will be collected and analyzed for decontamination verification.

7.5 EXPLOSION

Explosions and resultant releases may result in a significant threat to human health or the environment. The potential exists for hazardous or mixed waste (only at TA-16-88) to be released during an explosion. Implementation of this contingency plan is required whenever a sudden release that cannot be contained or that presents a threat to human health or the environment occurs as a result of an explosion.

In the case of explosions, all personnel will immediately evacuate the area. Any injured personnel will be decontaminated at the site, if required and if time allows. An LACFD ambulance will transport these personnel to an ESH-2 facility or to LAMC for treatment. If an injury is severe and requires immediate medical evacuation, the injured person will be wrapped to contain contamination, if necessary. In the case of an actual or potential explosion, on-site personnel will contact the EM&R Office immediately so that the Emergency Manager can ensure that all necessary emergency response personnel are alerted. The LACFD is notified automatically upon central alarm system activation. The Emergency Manager assumes incident command and will remain near but at a safe distance from the site in order to inform personnel responding to the explosion of the known hazards.

If a fire results from an explosion, the LACFD Senior Officer will, upon arrival at the scene, evaluate all available information and determine the appropriate firefighting methods and tactics. The LACFD Senior Officer will direct firefighting operations under the general direction of the IC.

7.6 FIRE

Fires and resultant releases of hazardous or mixed waste may result in a significant threat to human health or the environment. Implementation of this contingency plan is required whenever a fire incident results in a sudden release of hazardous or mixed waste that cannot be contained or that presents a threat to human health or the environment.

Depending on the size of the fire and the fuel source, portable fire extinguishers may be used. However, LANL policy encourages immediate evacuation of the area and notification of the LACFD. For any fire, including a fire that involves hazardous or mixed waste, the responsible Group Leader and the EM&R Office must be contacted immediately. The Emergency Manager

will alert the LACFD and all other necessary emergency response personnel. If the fire spreads or increases in intensity, all personnel must evacuate to an area designated by the responsible Group or Section Leader or Emergency Manager. The Emergency Manager assumes incident command and will remain near the scene to advise personnel responding to the fire of the known hazards.

Upon arrival at the scene, the LACFD Senior Officer will evaluate all available information and determine the appropriate firefighting methods and tactics. The LACFD Senior Officer will direct firefighting operations under the general direction of the IC.

7.7 UNPLANNED NONSUDDEN RELEASES

Nonsudden releases include those incidents that, if uncontrolled, impact the environment over a long period of time. Such incidents include minor leaks from containers, loss of secondary containment integrity, and incomplete treatment.

7.7.1 Responsibility

The operating group is responsible for correction of a nonsudden release from a hazardous or mixed waste unit if the correction can be performed safely with normal maintenance and management procedures. Otherwise, the operating group will call the EM&R Office for assistance. Any correction methods for nonsudden releases that have resulted in an impact to the environment will be coordinated with NMED.

7.7.2 Nonsudden Releases

Not all failures can be predicted. In general, the response to a nonsudden release will be (1) to contain the release, (2) to correct the cause of the release, and (3) to clean up any release to a level that protects human health and the environment.

The operating group will conduct regularly scheduled inspections to detect failure of containment at the container storage area addressed in this application and to ensure that the containers are not leaking. In addition, the operating group will inspect the secondary containment systems regularly to ensure that the integrity of the containment systems has not deteriorated. If an inspection reveals that containers are leaking or that secondary containment has deteriorated, the operating group will ensure that maintenance or replacement of containment is performed, as appropriate.

7.7.3 Nonsudden Release Surveillance

In addition to routine inspection and site-specific sampling and testing, LANL has established an areawide environmental monitoring network maintained by ESH-19. Monitoring and sampling locations for various types of measurements are organized into three main groups. Regional monitoring stations located within the five counties surrounding Los Alamos County are placed up to 80 kilometers (50 miles) from LANL. These stations serve to determine background conditions. Perimeter stations, located within approximately 4 kilometers (2.5 miles) of the LANL boundary, document conditions in residential areas surrounding LANL. On-site stations, most of which are accessible only to employees during normal working hours, are within the LANL boundary.

Routine surveillance conducted at these stations includes measuring radiation and collecting samples of air particulates, surface waters, ground waters, soil, sediment, and foodstuffs for subsequent analysis. Additional samples provide information about particular events, such as major runoff events and nonroutine releases. Data from these efforts are used for comparison with standards, for background levels, and for radiation dose calculations.

7.8 EXPOSURE TO HAZARDOUS AND MIXED WASTE

If a person is exposed to hazardous or mixed waste, the affected person, a co-worker, or line management will notify the EM&R Office. Appropriate first aid should be administered immediately. An EM&R Office representative will notify ESH-10 directly, as soon as possible, so that exposure levels and decontamination requirements can be established. The injured person will then be quickly transported to the ESH-2 medical facility or to LAMC for evaluation. If possible, the material involved in the injury will be ascertained and the information given to the medical staff.

Other potential exposures will necessitate evacuation of the area, if appropriate, or under any of the following conditions:

- Irritation of the eyes, breathing passages, or skin
- Difficulty in breathing
- Nausea, light-headedness, vertigo, or blurred vision.

The affected person will be transferred to the ESH-2 medical facility or to LAMC. An ESH-1, ESH-5, or ESH-10 representative will attempt to ascertain what, if any, exposure occurred and what corrective measure is appropriate.

7.9 EVACUATION [20 NMAC 4.1, Subpart V, 264.52(f)]

A facility will be evacuated upon the voice command to evacuate the area or upon the sounding of the evacuation or fire alarm.

7.9.1 Emergency Process Shutdown Prior To Evacuation

Personnel are instructed to shut down equipment prior to evacuating a building/area unless an immediate building/area evacuation is announced or signaled. To ensure efficient shutdown, training and exercises addressing the shutdown process are performed. In the case of an immediate evacuation, a selected team may shut down designated equipment in an evacuated area. The team will be equipped with the proper equipment, clothing, and breathing apparatus. If they are on location, ESH-1, ESH-5, and/or ESH-10 will provide advice and assistance. Process-shutdown procedures apply mainly to hazardous or mixed waste treatment units only.

7.9.2 Evacuation Plan

Emergency situations may warrant the shutdown and evacuation of areas or buildings in order to protect personnel and property, to anticipate the emergency condition, or to enhance the appropriate response. Table 7-4 lists the criteria for evacuation, persons responsible for initiating evacuations, and reentry conditions. Figures 7-3 and 7-4 show evacuation routes, alternate evacuation routes, evacuation trails and zones, and assembly/muster areas or stations for the burn grounds and for the container storage area addressed in this permit application.

To initiate the evacuation of a building/area, the evacuation or fire alarm is sounded and/or the PA system may be used. Evacuation alarms cannot be silenced and reset by site personnel. Only the Fire Alarm Maintenance Section at 667-4027 and the LACFD Platoon Chief at 667-7026 can silence and reset alarms. To evacuate a portion of a building or area, use of the PA system may be more appropriate. The PA system will notify the occupants of the area to be evacuated and will advise personnel throughout the building of the existence of a problem in a specific area. Once evacuation has been initiated and if conditions allow, personnel will turn off all equipment that could contribute to the hazard if left unattended. All personnel will then proceed from the affected area to the assembly/muster area.

In the event of the evacuation of a building, an outbuilding, or an outlying work area, the responsible Group or Section Leader will designate a control point at the closest safe location (e.g., considering wind direction). The designated area will be outside the affected area and will serve as an assembly/muster area where the Group or Section Leader, or designee, can oversee evacuation operations and work to prevent further spread of the hazard.

As personnel exit an affected building/area, a primary sweep of the building/area will be performed to ensure that all personnel have evacuated. If the building/area is evacuated, a Group or Section Leader designee will take attendance at the assembly/muster area and report personnel accountability to the IC. The evacuation procedure follows:

- The person discovering the accident or emergency will call 911 and ensure that line management and the EM&R Office are notified.
- Site-specific BEPs and/or emergency action procedures will be followed concerning evacuation, sweep, personnel accountability, and equipment shutdown procedures.

For a small-scale evacuation, a responsible on-site person may direct the evacuation. For a large-scale evacuation, the central alarm system may be activated. The EM&R Office will be notified immediately and will dispatch the duty Emergency Manager. A responsible on-site person may begin the evacuation process until the duty Emergency Manager arrives at the scene to assume that responsibility.

7.10 SALVAGE AND CLEANUP [20 NMAC 4.1, Subpart V, 264.56(g) and (h)]

Appropriate representatives from the ESH groups will survey the affected area before salvage and cleanup begin. They will conduct visual inspections and sampling of the affected area to determine whether cleanup is complete. If gases or fumes, electrical or radiological problems, or other conditions present a hazardous situation, personnel or selected teams equipped with proper breathing apparatus and protective clothing will reenter the area to perform designated decontamination tasks, repairs, and salvage to allow the return to normal operations. After an emergency, the IC will turn the operation over to the Recovery Manager, who will:

- Provide for proper handling of recovered waste, contaminated soil or surface water, or any other material that results from a spill, fire, or explosion. Contaminated material will be managed appropriately and temporarily stored at one of the hazardous or mixed waste storage areas at LANL. CST waste management groups will be responsible for determining the final disposition of the waste. This determination will be made in compliance with RCRA TSD standards.
- Arrange to monitor for damage or improper operation of the unit and associated equipment as a result of the emergency or of plant shutdown in response to the emergency.
- Arrange for site cleanup procedures to be completed and ensure that no waste that may be incompatible with the released material is treated or stored in the same area.
- Ensure that emergency equipment is cleaned, decontaminated, and fit for its intended use before operations are resumed. Equipment will be inspected visually and then sampled, if necessary, to determine the type and degree of contamination and to determine appropriate cleanup measures.

The Recovery Manager is the functional equivalent of the RCRA Emergency Coordinator for post-emergency actions.

Prior to resuming operations, facility management will verify that the previously mentioned tasks have been performed. The owner/operator (DOE/LAAO) will notify appropriate state and local authorities that cleanup procedures are completed and that emergency equipment is clean and fit for its intended use.

The IC assumes the coordination of post-emergency actions (particularly during the time period immediately following the emergency) until a Recovery Manager is appointed. The Recovery Manager then assumes this coordination role. The post-emergency actions include cleanup operations, repairing vital equipment, or interim hazard-removal operations (such as arranging for the demolition of unstable walls). The services of the affected operational organizations, ESH groups, JCI, and other on-site resources will also be used to estimate cleanup costs and operational impact.

7.11 POST-EMERGENCY ASSESSMENT

When the emergency is over, the cause of the emergency and the effectiveness of the response are investigated in an effort to prevent future emergencies and to facilitate more effective responses to them. Following each event requiring the implementation of this contingency plan, the EM&R Office will schedule and conduct a critique with representatives from all response groups, with representatives in the building/area in which the emergency occurred, and with LANL management to determine the adequacy of the response.

7.12 EMERGENCY RESPONSE RECORDS AND REPORTS [20 NMAC 4.1, Subpart V, 264.56(j)]

Any emergency that requires implementation of the contingency plan will be documented by the Group or Section Leader responsible for the hazardous or mixed waste unit, and reported in writing within 15 days to NMED. The incident report, submitted by DOE/LAAO, will include the following data:

- Name, address, and phone number of owner or operator
- Name, address, and phone number of the facility
- Date, time, and type of incident (e.g. fire, explosion, spill)
- Name of material(s) involved
- Quantity of material(s) involved
- Extent of injuries (if any)
- Assessment of actual or potential hazards to human health or the environment
- Estimated quantity and disposition of material recovered from the incident.

Various LANL personnel responding to the emergency will record the details of any incident requiring implementation of this plan. The CAS operator, the EOC communicator, the Emergency Manager, and/or the Group or Section Leader responsible for the hazardous or mixed waste management area in which the emergency occurred will record the date, time, location of the incident, wastes/materials involved, injuries (if any), property damage (if any), and a detailed description of the incident. This information will be maintained in the facility operating record. ESH-7 will supply information concerning any follow-up actions. Appropriate LANL personnel will provide details regarding the removal and disposition of hazardous and mixed wastes associated with the emergency.

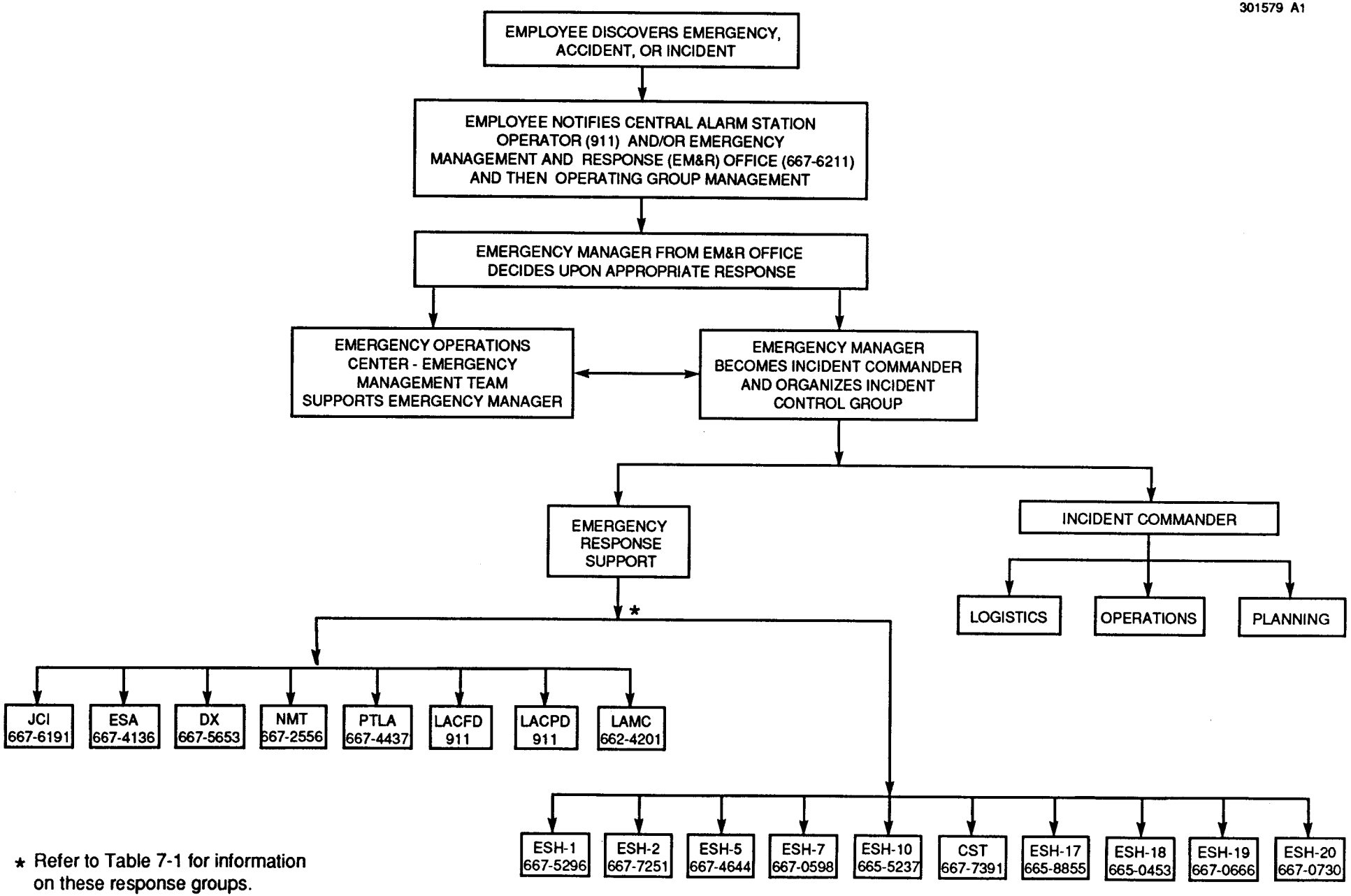
7.13 CONTINGENCY PLAN AMENDMENT [20 NMAC 4.1, Subpart V, 264.54]

This contingency plan will be reviewed periodically by the EM&R Office, CST waste management groups, and ESH-19 and, if necessary, will be reviewed as appropriate by ESH-10. The plan will be amended immediately if determined to be inadequate to handle releases (spills, explosions, and/or fires), and whenever:

- The facility permit is revised
- There is change in the design or operation of the facility (e.g., quantities of waste handled and handling techniques) that increases the likelihood of an emergency and requires changes in emergency response
- The list of Emergency Managers changes
- The list of emergency equipment changes significantly.

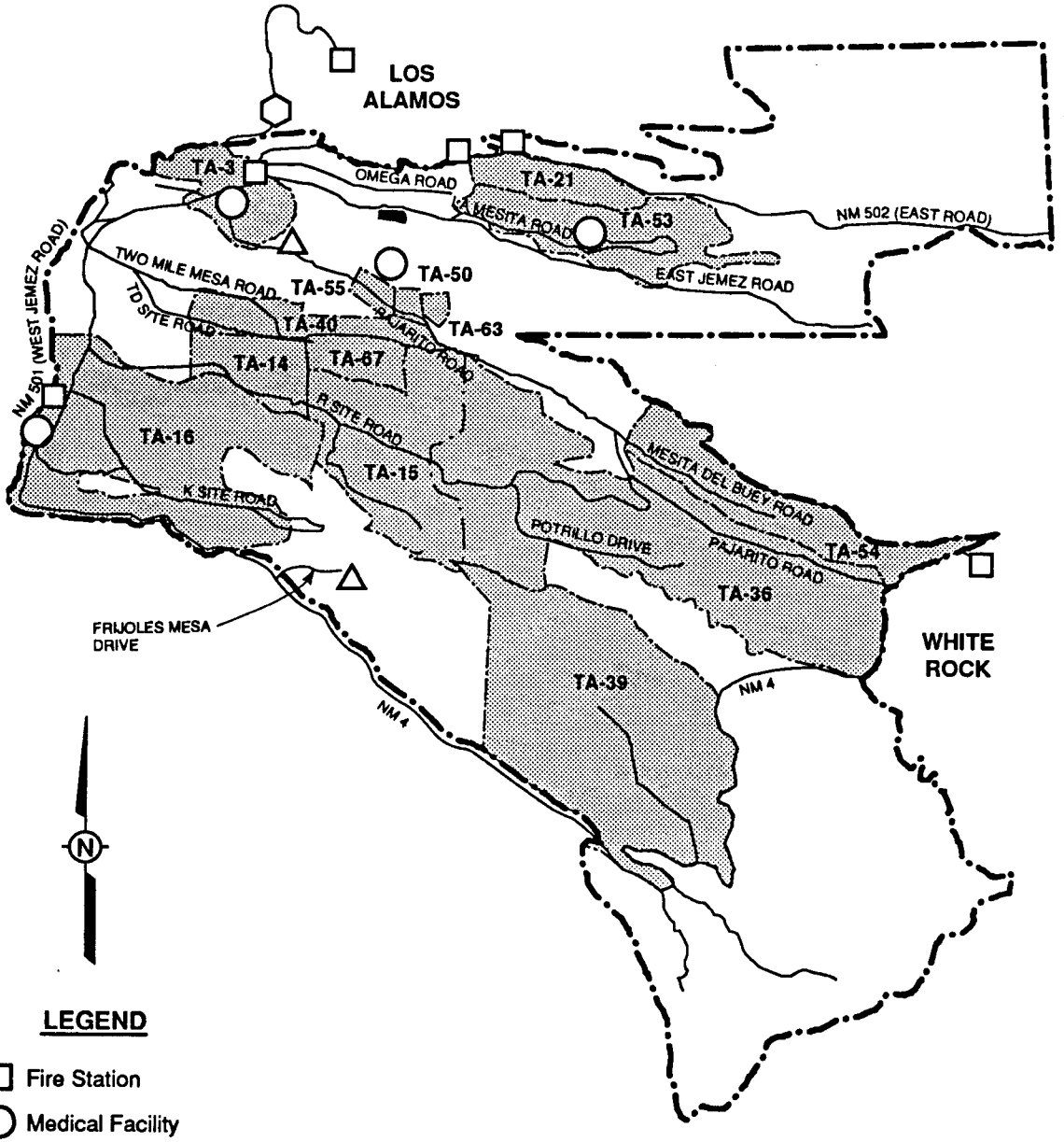
This plan is a controlled document distributed by ESH-19. Amendments to this contingency plan will be distinguished by the revision number and date of revision noted in the upper right-hand corner of each page. Amendments will be issued to all contingency plan holders and will include a cover letter that describes the plan changes and the rationale for those changes.

301579 A1



* Refer to Table 7-1 for information on these response groups.

Figure 7-1
Hazardous and Mixed Waste Emergency Notification Structure



LEGEND

- Fire Station
- Medical Facility
- Hospital
- Emergency Operations Center
- Shading indicates technical areas (TAs) in which hazardous or mixed waste management units are located or planned for construction.
- Not Los Alamos National Laboratory property.

4800 0 4800
Scale in Feet

Modified from Los Alamos National Laboratory, 1994, "Environmental Surveillance at Los Alamos During 1992," LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 7-2
Emergency Facilities

301579 A4

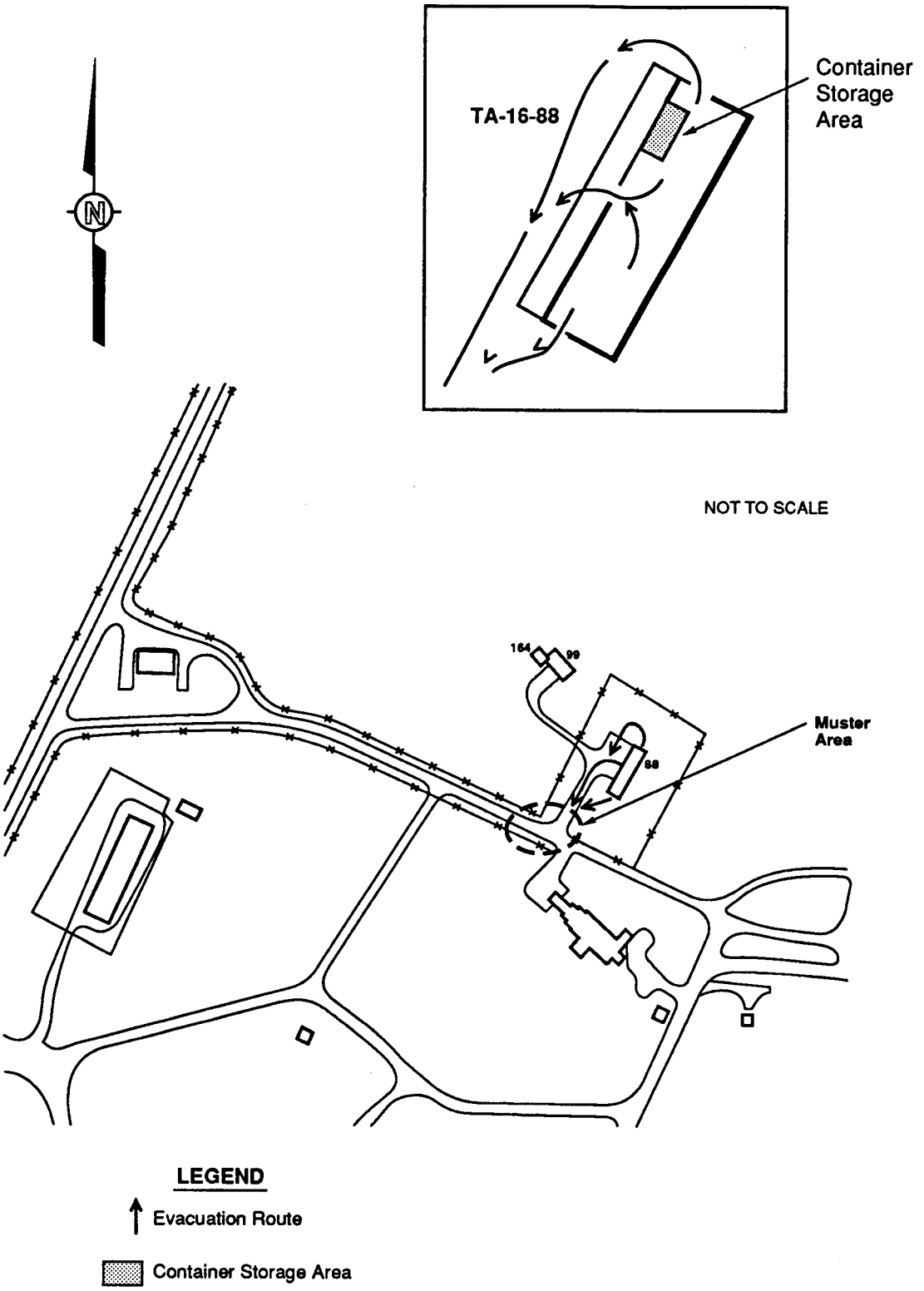


Figure 7-3

Evacuation Routes and Muster Area at Technical Area (TA) 16, Building 88, Container Storage Area

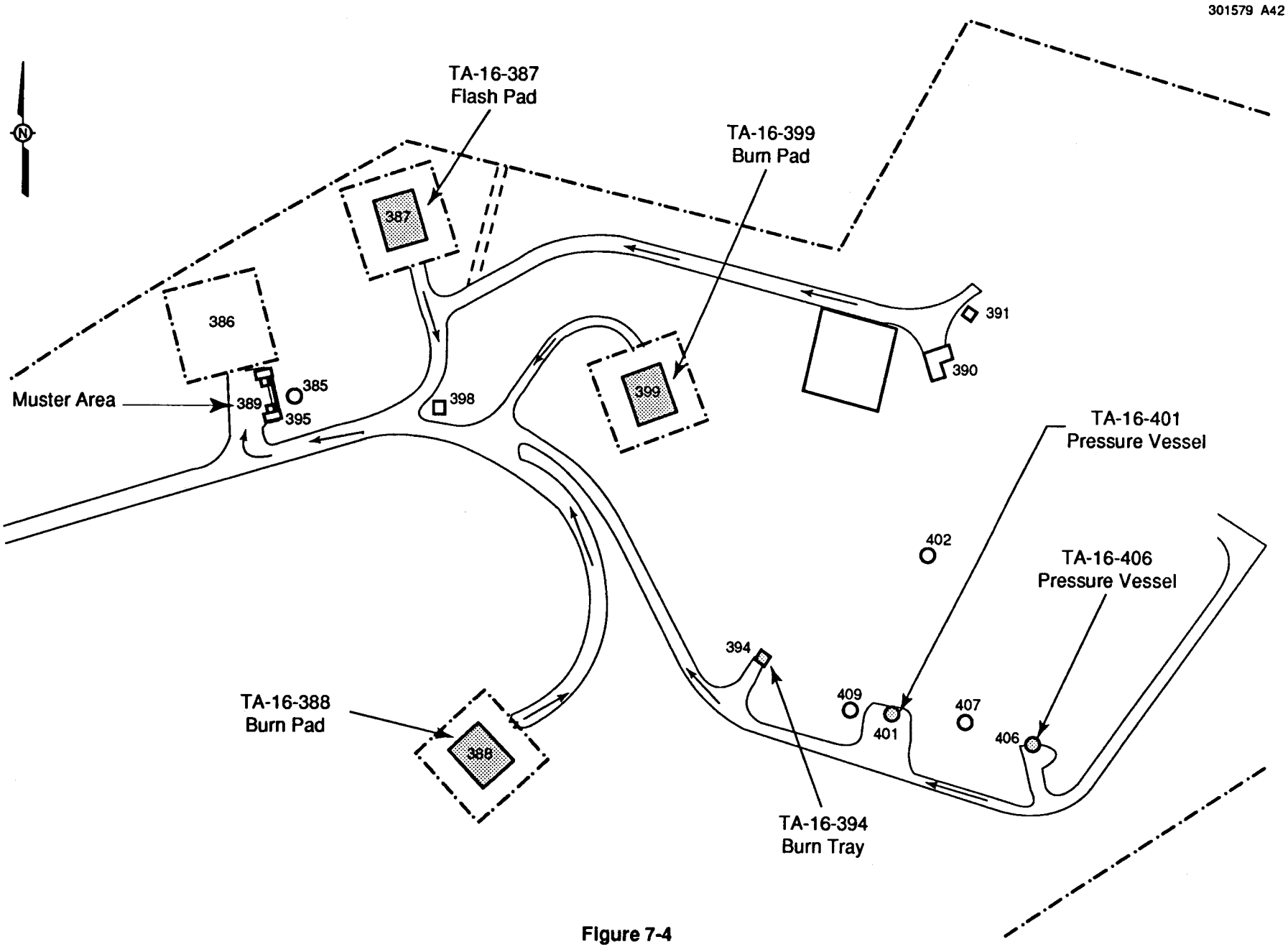


Figure 7-4
Evacuation Routes and Assembly/Muster Area at Technical Area (TA) 16 Burn Ground

Table 7-1

Response Groups and Agencies Available to the Emergency Management and Response Office for Guidance and/or Emergency Assistance

LANL[a]-Controlled Response Group	Telephone	Responsibilities
ESH-1, Health Physics Operations	667-5296	Provides routine guidance on radiological decontamination. Provides routine site evaluation and monitoring to determine the nature and extent of contamination (radiological).
ESH-2, Occupational Medicine	667-7251	Provides emergency medical treatment.
ESH-5, Industrial Hygiene and Safety	667-4644	Provides guidance on industrial hygiene equipment and on operational safety.
	665-4427	Provides routine site evaluation/support field testing to determine the nature and extent of contamination (chemical).
ESH-7, Occurrence Investigation	667-0598	Reports occurrences and tracks follow-up actions.
ESH-10, Hazardous Materials Response	665-5237	Provides emergency site evaluation/field monitoring (chemical and radiological). Specifies protective clothing and equipment. Dispatches Hazardous Materials Response Team. Provides support for chemical, radiological, hazardous, and mixed waste incidents and decontamination of responders and response equipment.
CST, Chemical Science and Technology Division	667-7391	Provides guidance on proper treatment, storage, and off-site shipment of hazardous and mixed waste.
ESH-17, Air Quality	665-8855	Provides information on meteorological conditions.
ESH-18, Water Quality and Hydrology	665-0453	Provides information on hydrologic conditions.
ESH-19, Hazardous and Solid Waste	667-0666	Provides guidance on regulatory requirements. Conducts field surveys to determine spread of contamination and adequacy of cleanup.
ESH-20, Environmental Assessments and Resource Evaluations	667-0730	Provides information on biotic conditions.
NMT, Nuclear Materials Technology Division	667-2556	Monitors for leaks, pressure buildup, gas generation, or equipment ruptures in the event of an emergency at TA-55.
PTLA, Protection Technology Los Alamos	667-4437	Provides traffic control, security.

Refer to footnotes at end of table.

Table 7-1 (Continued)

Response Groups and Agencies Available to the Emergency Management and Response Office for Guidance and/or Emergency Assistance

LANL[a]-Controlled Response Group	Telephone	Responsibilities
JCI, Johnson Controls World Services Inc.	667-6191	Dispatches maintenance personnel and equipment. Assists in waste cleanup under direction of Recovery Manager.
Non-LANL[a]-Controlled Response Group	**Telephone**	**Responsibilities**
Los Alamos County Fire Department	667-7080	Dispatches firefighting personnel, equipment, and Emergency Medical Technicians.
Los Alamos County Police Department	662-8222	Provides traffic control on public access roads.
Los Alamos Medical Center[b]	662-4201 662-2455	Provides medical services. Provides and maintains Emergency Room.

[a] Los Alamos National Laboratory.
[b] Medical services related to hazardous and mixed waste injuries are provided under the direction of ESH-2.

Table 7-2

Emergency Management and Response Office Emergency Managers[a]

Emergency Managers[b]	Laboratory Telephone	Home Telephone	Home Address
Gary W. Bequette	667-6211	662-5636	1781 37th St., Los Alamos, NM
Cheryl S. Bequette	667-6211	662-5636	1781 37th St., Los Alamos, NM
George Van Tiem	667-6211	662-4623	197 El Viento St., Los Alamos, NM
Ed Nettles	667-6211	662-5690	1461 Oakwood Lp., Los Alamos, NM
Eugene Darling	667-6211	662-2521	1860 Camino Redondo, Los Alamos, NM
Douglas Tuggle	667-6211	672-1231	117 Grand Canyon Drive, White Rock, NM

[a] To ensure immediate response, the Emergency Manager may be reached at the Emergency Management and Response Office (667-6211 or after hours, 667-7080).

[b] Assignments as the designated (i.e., primary) Emergency Manager are rotated. A current schedule is maintained at the Emergency Management and Response Office (667-6211 or after hours, 667-7080) and at the Central Alarm Station (911).

Table 7-3

Waste Analysis Parameters and Test Methods[a]

Parameter	Test Method	Reference[b]
Ignitability	Pensky-Martens closed-cup method	(L) SW1010 (L) ASTM D93-80
Reactivity	Test method to determine hydrogen cyanide released from waste Test method to determine hydrogen sulfide released from waste	(L,S) SW Section 7.3
Corrosivity	Electrometric (pH of aqueous solution)	(L) SW9040A
Toxicity characteristic:	Toxicity characteristic leaching procedure (TCLP) extraction and graphite furnace atomic absorption (AA) spectroscopy, gaseous hydride AA, or direct aspiration AA	(S) Method SW1311
Arsenic		(L,S) SW7060A, SW7061A
Barium		(L,S) SW7081, SW7080A
Cadmium		(L,S) SW7131A, SW7130
Chromium		(L,S) SW7191, SW7190
Lead		(L,S) SW7421, SW7420
Selenium		(L,S) SW7740, SW7741A
Silver		(L,S) SW7761, SW7760A
Mercury	TCLP extraction or dissolution steps and manual cold-vapor technique	(L) SW7470A, (S) SW7471A
Volatile organics	TCLP extraction and gas chromatography/ mass spectrometry (GC/MS)	(L,S) SW8240B
	GC/MS capillary column technique	(L,S) SW8260A
Semivolatile organics	TCLP and GC/MS	
	packed column technique	(L,S) SW8250A
	GC/MS capillary column technique	(L,S) SW8270B

Refer to footnotes at end of table.

Table 7-3 (Continued)

Waste Analysis Parameters and Test Methods[a]

Parameter	Test Method	Reference[b]
Organochlorine pesticides	TCLP extraction and GC	(L,S) SW8080A
Chlorinated herbicides		(L,S) SW8150B
Chemical composition	95% organic composition by GC/flame ionization detector (FID)	(L) SW8100
Trace organic analysis	Any of the following:	
	Volatile organic compounds-GC/MS	(L,S) SW8240B
	- Capillary column technique	(L,S) SW8260A
	Semivolatile organic compounds-GC/MS	
	- Packed column technique	(L,S) SW8250A
	- Capillary column technique	(L,S) SW8270B
Heat value	Bomb calorimeter	(L) A006, ASTM D240
Organic chloride	Halide titration of combustion residue	(L,S) A004, ASTM D2361
Ash content	Residue after combustion in muffle furnace	(L) A001, ASTM D482 (S) A001, ASTM D3174
Cyanide, free and total	Distillation and colorimetric ultraviolet	(L,S) SW9010A, SW9012
Total chromium	Colorimetric method for hexavalent chromium	(L,S) SW7196A
Sulfide	Colorimetric titration	(L,S) SW9030A

Refer to footnotes at end of table.

Table 7-3 (Continued)

Waste Analysis Parameters and Test Methods[a]

Parameter	Test Method	Reference[b]
Total metals[c]	Acid digestion	(L) SW3010A, (S) SW3050A
	Inductively coupled plasma emission spectroscopy	(L,S) SW6010A
Arsenic		(L,S) SW6010A
Barium		(L,S) SW6010A
Beryllium		(L,S) SW6010A
Cadmium		(L,S) SW6010A
Chromium		(L,S) SW6010A
Lead		(L,S) SW6010A
Nickel		(L,S) SW6010A
Selenium		(L,S) SW6010A
Silver		(L,S) SW6010A
Thallium		(L,S) SW6010A
Zinc		(L,S) SW6010A
Mercury	Manual cold-vapor technique	(L) SW7470A
		(S) SW7471A
Free liquids	Paint Filter Liquids Test	(S) SW9095

[a] At Los Alamos National Laboratory, current analytical capabilities include limited analyses of mixed waste samples. These analyses include gross alpha, beta, and gamma screening.

[b] "A" (e.g., A006) refers to U.S. Environmental Protection Agency, 1984, "Sampling and Analysis Methods for Hazardous Waste Combustion," EPA-600/8-84-002.
"ASTM" refers to American Society for Testing and Materials standards.
"SW" refers to U.S. Environmental Protection Agency, 1992, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
(L) refers to liquid waste.
(S) refers to solid waste.
See 55 *Federal Register* 11863.

[c] See also Atomic Absorption Methods listed under TCLP.

Table 7-4

Evacuation Determination and Reentry Conditions

Reason for Evacuation	Evacuation Determination Made by	Reentry Conditions[a]
Fire	Fire or evacuation alarm, Group Leader or alternate, Lead Engineer, Senior Staff Member present, Senior Technician, or Emergency Manager	Following survey by the Chief Fire Officer, ESH-1[b], ESH-5[c], and/or ESH-10[d], and R&D[e] supervision
Explosion	Same as above	Same as above
Loss of ventilation	Group Leader or alternate, Senior Staff Member, Lead Engineer, or Senior Technician	Following survey by ESH-1 and/or ESH-5, and R&D supervision
Loss of electric power	Same as above	Same as above
Extensive contamination	Same as above or ESH-1 Representative	Same as above or ESH-10
Airborne contamination	Same as above or Radiation Monitor	Same as above or ESH-10
Escape or release of toxic or hazardous gas or fumes	Group Leader or alternate, Senior Staff Member, Lead Engineer, Senior Technician, or Emergency Manager	Same as above plus ESH-5 or ESH-10
Bomb or bomb threat	EM&R[f] or PTLA[g] representative, R&D Section Leader or alternate, Senior Staff Member, or Lead Engineer	Following determination by the Emergency Manager or HDT[h] Leader

[a] All reentries are authorized by the Incident Commander.
[b] "ESH-1" refers to the Health Physics Operations Group.
[c] "ESH-5" refers to the Industrial Hygiene and Safety Group.
[d] "ESH-10" refers to the Hazardous Materials Response Group.
[e] "R&D" refers to the Research and Development Section.
[f] "EM&R" refers to the Emergency Management and Response Office.
[g] "PTLA" refers to Protection Technology Los Alamos.
[h] "HDT" refers to the Hazardous Devices Team.

ATTACHMENT 7-1

Emergency Equipment

Attachment 7-1

Emergency Equipment

Hazardous Materials (HAZMAT) Vehicles and Associated Emergency Equipment:

Hazardous Materials (HAZMAT) vehicles and trailers are located at Technical Area (TA) 52. They are available to the Environment, Safety, and Health (ESH) Hazardous Materials Response Group (ESH-10) for emergency response to all of the TAs at Los Alamos National Laboratory (LANL). ESH-10 is responsible for maintaining the supplies of appropriate emergency equipment in each vehicle and trailer.

The HAZMAT vehicles and trailers are equipped with safety and emergency equipment, personal protective clothing, and other supplies, which may include, but are not limited to: assorted coveralls, T-shirts, and gloves; safety goggles and glasses; boots and booties; face shields; total encapsulation suits and boots; Level A and B suits; flash suits; self-contained breathing apparatus (SCBA) and SCBA bottles; hazardous chemical reference books and other reference materials; shovels; siphon pumps; assorted spill kits and sorbents; chemical burn and neutralizing solutions; communication radios; bottles of leak detector; leak repair kits; emergency repair packs; HAZMAT bags; gas detectors; respirators and cartridges; sponges and cleaners; warning signs; traffic control barriers; flashlights; timers; cameras and film; knives; warning and signal horns; harnesses and belts; portable emergency oxygen; and assorted tools, tape, and other supplies.

Attachment 7-1

Emergency Equipment

TA-16

Emergency equipment at TA-16-88 available for use at the hazardous and mixed waste container storage area:

FIRE CONTROL EQUIPMENT

Three fire extinguishers:

1 Halon is located next to the front door at the northwest corner of TA-16-88
1 Metal-X is located next to the front door at the northwest corner of TA-16-88
1 Container of graphite powder is located next to the front door at the northwest corner of TA-16-88

General capabilities

These portable units have a 30-pound capacity and may be used by any employee in the event of fire. Carbon dioxide (CO_2) and water fire extinguishers are located throughout TA-16.

One fire hydrant is approximately 100 ft south of TA-16-88

General capabilities

This fire hydrant will supply water at adequate volume and pressure to satisfy the requirements of 20 NMAC 4.1, Part V, 264.32.

SPILL CONTROL

The floor of TA-16-88 has been sealed with epoxy paint and is bermed along the interior walls to minimize contamination in the event of a spill.

COMMUNICATION EQUIPMENT

Centron Telephone System:

One Centron telephone is located inside near the front door at the northwest corner of TA-16-88

One Centron telephone is located outside near the front door at the northwest corner of TA-16-88

General Capabilities

Telephones for internal and external communication are available for use by all employees. A video explaining alarms and evacuation procedures must be viewed prior to entering the site.

DECONTAMINATION EQUIPMENT

One portable eye wash available
Material Safety Data Sheets (MSDS) available

Attachment 7-1

Emergency Equipment (Continued)

Emergency equipment at TA-16-88, continued

General Capabilities

The eye wash is used by personnel who receive a chemical splash to the eyes. MSDSs for the chemical(s) should be obtained prior to working with hazardous waste or hazardous material to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

Air purifying respirators, first aid kits, and hearing protection gear are located in the control bunker.

Emergency equipment available at the TA-16 burn ground:

FIRE CONTROL EQUIPMENT

Five fire extinguishers:

One at Building 1409
Two at the Waste Water Treatment Facility
Two at the main shelter

General Capabilities

These portable units have a 30-pound capacity and may be used by any employee in the event of fire. CO_2 and water fire extinguishers are located throughout TA-16.

Main fire hydrant in the middle of the burning ground
Fire hydrants in the area of TA-16-388 and -399
A boom truck, tank truck and dump truck are available

SPILL CONTROL

1 spill control kit in center of the burning ground
1 spill control kit in storage area 386
Spill control equipment in storage shed

COMMUNICATION EQUIPMENT

2-way radios in TA-16-389 and in the mobile HE van
3 telephones at the burning ground
1 cellular telephone carried by burning ground technicians
Central public address system

General Capabilities

Telephones for internal and external communication are available for use by all employees

Attachment 7-1

Emergency Equipment
(Continued)

Emergency equipment at TA-16-88, continued

DECONTAMINATION EQUIPMENT

Portable eye washes throughout the facility
Material Safety Data Sheets Available

General Capabilities

The eye wash is used by personnel who receive a chemical splash to the eyes. MSDSs for the chemical(s) should be obtained prior to working with hazardous waste or hazardous material to determine if the application water is indicated for decontamination

Attachment 7-1

Emergency Equipment
(Continued)

Supplemental emergency equipment and personnel available from the Los Alamos County Fire Department:

	Number
Engine companies - 1,250 gallons per minute	
Engines 1, 3, 4, 5, 6, 10, and 40	7
Engine 50 (Reserve) - 1,000 gallons per minute	1
Mini-pumpers	
MT-1, -3, -4, and -5	4
Modular ambulances	4
3 First line - M1, M3, M4	
1 Reserve Unit - M10	
Rescue vehicles	3
1 First Line	
1 Stored at Station #5, Out of Service	
1 Newly Purchased	
Crash-Fire-Rescue (CFR) units	2
CFR 6	
SCBA units	44
SCBA air tanks	130
105-foot tower ladder with pump - 1,500 gallons per minute	1
Personnel with 120 hours Emergency Medical Technician training	90
Personnel with Advanced Life Support training	14
Water tankers	5
T-1 = 1,500 gallons	
T-3 = 2,500 gallons	
T-4 = 3,000 gallons	
T-5 = 2,500 gallons	
T-50 = 1,500 gallons	

Attachment 7-1

Emergency Equipment
(Continued)

Supplementary emergency equipment and personnel available from Johnson Controls World Services Inc.:

	Number
TRANSPORTATION:	
Pickups, 1/2 through 3/4 ton	183
Trucks, 1 through 3 ton	25
Buses (11-passenger)	2
Vans, panels, and carryalls	24
SPECIAL EQUIPMENT:	
Road grader, Cat, self-propelled blade, with radio	1
Grader, John Deere, self-propelled, with radio	2
Loaders, bucket, Melroe, Bobcat, 1/3 cubic yards	3
Loader, bucket, Cat, 2-3/4 cubic yards, with radio	1
Loader, Fiat-Allis, 3 cubic yards	1
Loader, bucket, Cat, 2-1/2 cubic yards	1
Loader, bucket, Cat, 3-1/4 cubic yards	1
Loader, bucket, Yale, 3 cubic yards, with radio	1
Loader, bucket, backhoe, Case, 1-1/2 cubic yards	1
Loaders, bucket, backhoe, Case, 7/8 cubic yards	2
Loader, backhoe, Ford, 1 cubic yard	1
Snowplows, Bombardier, with blade	2
Bulldozer, D-8, Crawler	1
Bulldozers, TD-25, International	2
Scraper, Terex, self-propelled	1
Scraper, Fiat-Allis, self-propelled	1
Bulldozer, 280, rubber-tired, with radio	1
Semitrailers	7
Chain saws	(approx) 6
Flusher, street, 3,000-gallon truck, tanker, 500-gallon, FMC	1
Mobile transceivers (2-way, KOB-753)	144
Generators	6
Handsets (2-way)	113
Pageboys (1-way)	398
Welders, mounted on trailers and trucks	32

Attachment 7-1

Emergency Equipment
(Continued)

Supplementary emergency equipment and personnel available from Johnson Controls World Services Inc., (continued):

PERSONNEL:	Number
Heavy equipment operators	14
Clerks	10
Dispatchers	1
Mechanics	17
Power saw operators	8
Radio and telephone operators	1
Truck drivers	13

Attachment 7-1

Emergency Equipment
(Continued)

Emergency equipment and personnel at the Central Medical Facility and Satellite First-Aid Stations, ESH-2:

At TA-3 (SM-409) Central Clinic:

PERSONNEL:	Number
Physicians (2 casual)	7
Physician's Assistants (2 casual)	4
Nurses (3 casual and 1 at 75%)	10
X-ray Technicians	1
Clinical Laboratory Technicians (4 part-time)	5

SPECIAL EQUIPMENT-PORTABLE:	
Multichannel emergency receiver	1
Two-way radios on the State Med Net, the LANL Emergency Management channel, and the LANL Health-Safety Net	5
Cardiac monitors and defibrillators (1 backup)	2
Crash cart emergency equipment with E-tank oxygen (O_2)	1
Portable physicians' bag with medications	1
Portable suction unit	1
Portable stretchers, 1 ambulance, 2 gurney, 1 folding	4
Wheelchairs	3
O_2 tanks	3
Manual resuscitators	2
Intravenous (IV) stands	2
IV solutions	q.s.*
Otoscope/ophthalmoscopes	4
Portable sphygmomanometers	6
Stethoscopes	20
Anticontamination apparel	q.s.
Eye irritation solution	q.s.
Full set air splints	1
Industrial first-aid kits	3
Extrication and cervical collars, crutches, canes	q.s.
Suture sets	4
Protective apparel	4

*q.s. - inventory varies as needed.

Attachment 7-1

Emergency Equipment
(Continued)

Emergency equipment and personnel at the Central Medical Facility and Satellite First-Aid Stations, ESH-2 (continued):

At TA-3 (SM-409) Central Clinic (continued):

SUPPLIES-GENERAL:

Bedding/pillows
Rescue blankets
Burn blankets
Thermal/icing pouches
Multitrauma dressings, surgical and first aid supplies
Disposable ice bags

SPECIAL FACILITIES - NONPORTABLE:

Completely equipped emergency room with ambulance entrance
Emergency lighting system
Complete X-ray suite
Protective clothing, and wound counters
12-lead electrocardiograph (2)
Fully equipped crash cart with Life Pak, intubation equipment, emergency medications, etc.
Fully equipped decontamination room at Los Alamos Medical Center (LAMC) adjacent to the LAMC emergency room

TRANSPORTATION:

Full ambulance service is available within minutes to the central facility and all satellite clinics.
1983 Dodge Van

COMMUNICATION:

Base station on State Medical Net

At TA-53 Satellite First-Aid Station:

PERSONNEL:

Physician's Assistant (part-time)	1
Nurse (half-time)	10

*q.s. - inventory varies as needed.

Attachment 7-1

Emergency Equipment
(Continued)

Emergency equipment and personnel at the Central Medical Facility and Satellite First-Aid Stations, ESH-2 (continued):

At TA-53 Satellite First-Aid Station (continued):

SPECIAL EQUIPMENT - PORTABLE:

Beeper	1
Stretcher	1
Wheelchair	1
O_2 tank	1
IV solutions	q.s.
Otoscope/ophthalmoscopes	2
Sphygmomanometer	1
Stethoscope	2
Anticontamination apparel	q.s.
Eye irrigation solution	q.s.
Industrial first-aid kit	1
Extrication and cervical collars	1
Crutches	1
Suture set	1

SUPPLIES:

Ample first aid supplies

At TA-16 (S-Site) Satellite First-Aid Station:

PERSONNEL:

Nurse (half-time)	1

*q.s. - inventory varies as needed.

Attachment 7-1

Emergency Equipment
(Continued)

Emergency equipment and personnel at the Central Medical Facility and Satellite First-Aid Stations, ESH-2 (continued):

At TA-16 (S-Site) Satellite First-Aid Station (continued):

SPECIAL EQUIPMENT - PORTABLE:

Ambu bag	1
Stretcher	1
Wheelchair	1
O_2 Tank	1
IV solutions	q.s.
Otoscope/ophthalmoscopes	1
Sphygmomanometer	2
Industrial first-aid kit	1
Crutches	1
Cane	1
Disposable suture set	1
Full face shields, vinyl apron	1
Endotracheal tube laryngoscope	1
Digital thermometer	1

SUPPLIES:

Ample first aid supplies

At TA-55 Satellite First-Aid Station:

PERSONNEL:

Nurse (half-time)	1

*q.s. - inventory varies as needed.

Attachment 7-1

Emergency Equipment
(Continued)

Emergency equipment and personnel at the Central Medical Facility and Satellite First-Aid Stations, ESH-2 (continued):

At TA-55 Satellite First-Aid Station (continued):

SPECIAL EQUIPMENT - PORTABLE:

Beeper	1
Stretcher	1
Wheelchair	1
O_2 tank	1
Otoscope/ophthalmoscopes	1
Sphygmomanometer	1
Stethoscope	1
Contamination apparel	q.s.
Eye irrigation system	1
Inflatable limb traction splints (set)	1
Industrial first-aid kit	1
Cervical collar	1
Crutches (pair)	1
Ambu bag	2

SUPPLIES:

Ample first aid supplies

*q.s. - inventory varies as needed.

8.0 PERSONNEL TRAINING

This section describes the personnel training program for Los Alamos National Laboratory (LANL). Training requirements for facility personnel are specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart V, 264.16, "Personnel Training," and are submitted with the Resource Conservation and Recovery Act (RCRA) Part B permit application as specified in 20 NMAC 4.1, Subpart IX, 270.14(b)(12). The primary objective of the training program is to prepare persons to operate and maintain safely those areas managing hazardous and/or mixed waste in accordance with 20 NMAC 4.1, Subpart V. This training program applies to all employees of the U.S. Department of Energy, the University of California, and any of their subcontractors who work regularly at LANL and who handle or generate hazardous and/or mixed waste. The degree of training varies with the job duties. However, all personnel who may handle or generate hazardous and/or mixed waste receive an introduction to RCRA.

All personnel within the Engineering Sciences and Applications (ESA) and Dynamic Experimentation (DX) Divisions must read all appropriate standard operating procedures and receive on-the-job training (OJT) specific to high-explosives (HE) handling.

8.1 HAZARDOUS AND MIXED WASTE MANAGEMENT RESPONSIBILITIES

Waste management groups within the Chemical Science and Technology (CST) Division and the Hazardous and Solid Waste Group (ESH-19) are responsible for all waste management activities except for HE waste treatment, which is handled by the ESA and DX Divisions. The Nuclear Materials Technology (NMT) Division is responsible for waste management activities at Technical Area 55. With the noted exceptions, CST waste management groups are responsible for all day-to-day operational aspects of waste management. ESH-19 is responsible for providing waste management regulatory guidance to CST and to waste generators. Johnson Controls World Services Inc. (JCI) provides trained personnel to assist CST in waste handling activities. Personnel in the Health Physics Operations Group (ESH-1), Occupational Medicine Group (ESH-2), Industrial Hygiene and Safety Group (ESH-5), Occurrence Investigation Group (ESH-7), Hazardous Materials Response Group (ESH-10), Air Quality Group (ESH-17), Water Quality and Hydrology Group (ESH-18), Environmental Assessments and Resource Evaluations Group (ESH-20), and personnel in ESH-19 are trained in their specialties to provide emergency response support. Protection Technology Los Alamos (PTLA) is responsible for LANL security, traffic control, and site access control. The Emergency Management and Response (EM&R) Office provides emergency planning and response at LANL and has the overall responsibility for LANL's Emergency Management Plan (EMP) training. The Environment, Safety, and Health

(ES&H) Training Group (ESH-13) is responsible for developing and delivering LANL-wide ES&H training. Environmental courses are designed with substantial input from the ESH-19 and CST waste management groups and others, as appropriate.

8.2 TRAINING CONTENT, FREQUENCY, AND TECHNIQUES [20 NMAC 4.1, Subpart IX, 270.14(b)(12); 20 NMAC 4.1, Subpart V, 264.16(a), (b), and (d)]

The training program instituted at LANL includes a combination of LANL-wide courses (received internally or through external vendors and usually classroom-based), facility-specific training (developed and delivered within a particular facility), and OJT (performance-based courses that focus primarily on procedures performed by individual workers). Each of these types of training is described briefly in Sections 8.2.1 through 8.2.3. All LANL, JCI, and PTLA employees receive the appropriate level of training within six months of their date of hire or transfer. Personnel will not work in unsupervised positions until they successfully complete the appropriate level of training for their positions and responsibilities.

Records of LANL-wide training sponsored or administered by ESH-13 are entered by that group into the Employee Development System (EDS), the official LANL training database. These records document that the required training has been successfully completed by the worker. Training records of former workers are kept for at least three years from the date last worked at the facility. It is required that records documenting successful completion of facility-specific, on-the-job, or externally provided training be entered into EDS by sponsoring organizations. Group or section training personnel will maintain, at a minimum, hard copies of training records for currently employed workers until the facility closes.

A table, provided as Attachment 8-1, summarizes the components of the LANL-wide training program as administered through ESH-13. This table includes a listing of the relevant training courses, a summary of topics, and a designation of the relevant courses for each job category. Attachment 8-2 summarizes the components of facility-specific and OJT that workers must receive. Each training element was designed to ensure that every worker involved in hazardous and/or mixed waste operations is properly trained in procedures relevant to the positions in which they are employed. Categories of workers include hazardous/mixed waste workers, managers of hazardous/mixed waste workers, emergency responders, and uncontrolled area potential release site workers.

Hazardous/mixed waste workers and managers of hazardous/mixed waste workers receive OJT specific to the hazardous/mixed waste facility to which they are assigned. In addition to the training topics specified in Attachment 8-2, OJT topics include maintaining operating records,

fulfilling reporting requirements, and conducting inspections specific to the facility. Workers whose duties include packaging and transportation support receive training on packaging, labeling, recordkeeping, and waste segregation for transportation within their facility. Emergency responders receive facility-specific training regarding emergency response and shutdown procedures at the facility to which they are assigned.

The outline of LANL's training programs, provided as Attachment 8-1, is on file in the ES&H Training Center and is available for review by all hazardous/mixed waste management and handling personnel, emergency response personnel, and regulatory agencies. Course content will be reviewed annually and updated as required to remain current with RCRA regulations. The ES&H Training Center maintains files listing the requisite skills, education, and training for workers who handle hazardous and/or mixed waste and the duties and responsibilities for each job description, as well as the name of each worker filling a job description, as required by 20 NMAC 4.1, Subpart V, 264.16(d)(2).

8.2.1 LANL-Wide Training

The personnel training courses emphasize compliance with requirements for the safe handling of hazardous and mixed waste. Program instructors are trained in hazardous and mixed waste management procedures and RCRA provisions. The training program is designed to provide training that is appropriate for the worker's responsibilities. Personnel who handle hazardous/mixed waste and/or clean up spills or releases of hazardous/mixed waste and the supervisors of these workers receive instruction on the appropriate topics listed in Attachment 8-1. In addition, personnel who conduct inspections of hazardous and/or mixed waste units and who are responsible for requisitioning the transport, treatment, or storage of hazardous and/or mixed waste receive training, as necessary, as listed in Attachment 8-1. Training may be provided by LANL instructors through ESH-13 or by external vendors knowledgeable about a particular subject.

8.2.2 Facility-Specific Training

All waste-handling personnel will participate in facility-specific training at their work locations. Attachment 8-2 addresses program requirements that ensure that hazardous and mixed waste management and handling personnel know the specific requirements for their facilities and are able to respond effectively to emergencies. Personnel will become familiar with emergency and monitoring equipment use, inspection, repair, and replacement at their facility. In addition, they will receive instruction on contingency plan contents (as they apply to their facility) and implementation including, but not limited to, communications or alarm systems, response to fire

and explosions at their facility, and key parameters for automatic waste feed cutoff systems and shutdown of facility operations.

8.2.3 On-the-Job Training

Performance-based OJT is developed in conformance with LANL standards. Supervisors or other experts who can evaluate worker proficiency provide training appropriate for the procedures required of each function-specific position. To become proficient in hazardous and/or mixed waste procedures, workers receive this performance-based training, as necessary.

8.2.4 Training Coordinator [20 NMAC 4.1, Subpart V, 264.16(a)(2)]

The ESH-13 Group Leader directs the personnel training program. The Group Leader is trained in the operation of hazardous and mixed waste management facilities, waste management practices, and emergency procedures and is responsible for coordinating training courses. Line managers ensure that personnel under their supervision receive necessary training.

8.3 EMERGENCY TRAINING [20 NMAC 4.1, Subpart V, 264.16(a)(3) and (c)]

If called upon by the EM&R Office, the outside professionals (JCI and PTLA) assist LANL's Emergency Manager at the scene of a hazardous or mixed waste emergency. These professionals are trained in their specialties (e.g., heavy equipment operation, hazardous material cleanups, traffic control, security). JCI personnel are also trained in personal safety. At all times during an emergency, these workers are under the direct supervision of the Crisis Manager or the Incident Commander in the Incident Control Group.

To ensure maximum protection of life and property and to mitigate the consequences of an emergency situation, all ESH, CST, ESA, DX, NMT, and JCI personnel involved in waste handling and emergency response must be knowledgeable about appropriate building and operating area emergency procedures. These workers participate in LANL's emergency training program.

Group leaders and immediate supervisors are responsible for ensuring that education and training in facility-specific emergency procedures and in LANL's emergency management program are provided to all personnel under their supervision. Training in facility-specific emergency procedures is given by the operating group. The EM&R Office provides training related to implementing LANL's EMP. Periodic announced and unannounced emergency drills and exercises are used to familiarize workers with emergency procedures. Training is also provided to workers through prominent instructional displays and through presentations and discussions in safety meetings.

Each new or transferred worker is indoctrinated by an immediate supervisor regarding the RCRA requirements that apply to job-related activities as well as to general and specific emergency procedures related to the work area. The immediate supervisor also advises each worker of changes to any emergency procedures and provides an annual review of procedures affecting the work area. ESH-13, with guidance from ESH-19, provides an annual refresher of applicable RCRA requirements. The sponsoring organization's office file currently maintains facility-specific training records.

Specialized training is given to personnel assigned special functions or specific emergency duties. Emergency response personnel are required to attend courses on implementation of the RCRA contingency plan, spill response, and Occupational Safety and Health Administration (OSHA) emergency response provisions. In addition, all waste management and handling personnel in CST, ESA, DX, and JCI participate in a training program in which they are instructed in emergency procedures pertinent to their work areas. The operating group provides this site-specific instruction.

8.4 IMPLEMENTATION OF TRAINING PROGRAMS

General Employee Training (GET), an introductory training program, is given on the first day of employment to all new employees. GET is also required of contract workers and visitors who work on site at LANL for ten or more consecutive days. GET includes, but is not limited to, ES&H policy, OSHA rights and regulations, industrial safety, waste minimization, general radiation protection, industrial hygiene, emergency management, and fire protection. All workers who will handle or be associated with mixed waste also receive courses in hazard communications, waste generator training, and radiation worker protection. Personnel who will handle or be associated with hazardous waste are required to take the hazard communications and waste generator training courses. Workers will not work in unsupervised positions or at a new position until they have been trained.

All hazardous and mixed waste management and handling personnel must attend annual refresher courses. These courses are intended to update personnel on LANL procedures and changes in RCRA provisions and to provide them with an overview of their introductory training. Line managers and group leaders will ensure that personnel participate in the appropriate introductory and annual training programs.

The Waste Generation Overview training course provides hazardous and mixed waste generators with information needed to identify wastes that are subject to RCRA regulations in

20 NMAC 4.1, Subpart II. The training defines hazardous waste and hazardous constituents (including hazardous components in mixed waste) and addresses how to identify hazardous waste and hazardous constituents. A second course, Waste Documentation Forms, focuses on documenting characterized waste according to RCRA and LANL requirements. Both training courses inform hazardous and mixed waste generators of their responsibilities and requirements and support the documentation of process knowledge, which generators may use to characterize hazardous and mixed waste.

ATTACHMENT 8-1

Los Alamos National Laboratory-Wide Training Program

Attachment 8-1

Los Alamos National Laboratory-Wide Training Program

COURSES	Hazardous/Mixed Waste Worker	Manager of Hazardous/Mixed Waste Workers	Supervisor of Hazardous/Mixed Waste Workers	Emergency Responder	Uncontrolled Area Potential Release Site Worker
General Employee Training (includes familiarization with standard operating safety guidelines)	X[a]	X	X	X	X
Waste Generation Overview (includes waste management regulations and policies, definition of hazardous waste, waste minimization, cycle of waste management at Los Alamos National Laboratory, storage and disposal)	X	X	X	X	X
Hazard Communications (includes explosion/fire hazards, chemical burns, chemical compatibility, eye/skin hazards and protection, respiratory hazards and protection, as applicable)	X	X	X	X	X
Radiation Worker I or II (requires recertification every two years)	*[b]	*	*	X	X
Resource Conservation and Recovery Act (RCRA) Personnel Training (includes RCRA provisions - overview of Code of Federal Regulations Title 40, Parts 260-265, 268, and New Mexico Administrative Code, Title 20, Chapter 4, Part 1; overview of Department of Transportation shipping regulations; inspections - internal and external protocol regarding facilities; operating equipment, communication systems, security systems; contingency plan; familiarization with emergency equipment use, inspection, and repair)	X	X	X	X	X

Refer to footnotes at end of attachment.

Attachment 8-1 (Continued)

Los Alamos National Laboratory-Wide Training Program

COURSES	Hazardous/Mixed Waste Worker	Manager of Hazardous/Mixed Waste Workers	Supervisor of Hazardous/Mixed Waste Workers	Emergency Responder	Uncontrolled Area Potential Release Site Worker
RCRA Annual Refresher (includes regulatory and legislative updates, occurrence reports and lessons learned, audit findings, modification/review of the contingency plan; provides required retraining)	X	X	X	X	X
First Aid: Standard (provides required triennial recertification)	X	X	X	X	X
Cardiopulmonary Resuscitation: Adult (provides required annual recertification)	X	X	X	X	X
Waste Documentation Forms (includes use of Waste Profile Form, use of waste disposal forms, use of manifest system, as applicable)	*		*		*
Respirators - Air Purifying (provides required annual retraining for operation and inspection of device, changing filters, donning and doffing)	*	*	*	X	*
Respirators - Self-Contained Breathing Apparatus (provides required annual retraining for operation and inspection, changing compressed air bottles, donning and doffing, safety features, care and cleaning, fitting)	*	*	*	X	*

Refer to footnotes at end of attachment.

Attachment 8-1 (Continued)

Los Alamos National Laboratory-Wide Training Program

COURSES	Hazardous/Mixed Waste Worker	Manager of Hazardous/Mixed Waste Workers	Supervisor of Hazardous/Mixed Waste Workers	Emergency Responder	Uncontrolled Area Potential Release Site Worker
Hazardous Materials Packaging & Transportation (HMPT) Introduction (includes introduction to regulations, identification of hazardous materials, placarding/labeling, manifesting/recordkeeping)	*		*		
HMPT Movement by Highway (includes placarding/labeling, segregation of hazardous materials)	*		*		
HMPT Preparing Shipments (includes packaging operations)	*		*		
HMPT Completing the Hazardous Materials Transfer Form for Radioactive Materials	*		*		
Spill Coordinator Training (includes accidental release and spill response procedures per the Spill Prevention, Control, and Countermeasures Plan)	*			X	

a X indicates a required course.
b * indicates that a course may be required for specific job tasks and/or work areas.

ATTACHMENT 8-2

Facility-Specific and On-the-Job Training for Hazardous and Mixed Waste Handling Operations

Attachment 8-2

Facility-Specific and On-the-Job Training for Hazardous and Mixed Waste Handling Operations

The following categories of facilities will provide facility-specific training for all workers and on-the-job training on procedures directly applicable to an individual's work assignment:

- Treatment units
- Incinerators
- Open burning and explosives detonation areas
- Container and tank storage areas
- Other categories, as necessary.

Facility-specific training will include the following topics:

- Supervised operation of the facility
- Emergency shutdown and evacuation procedures
- Accidental release and spill response procedures
- Familiarization with emergency equipment use, inspection, and repair
- Use of communication/alarm system
- Contingency plan training
- Operations manual specific to the facility
- Specialized equipment at the facility
- Information about the particular chemical and radioactive hazards present at the facility.

On-the-job training will consist of training individuals to be familiar with and use the standard operating procedures that apply to their jobs.

9.0 CLOSURE PLAN

This section describes the activities necessary to close the hazardous and/or mixed waste units addressed in this permit application (Figures 9-1 through 9-4). The activities detailed in this section are included to address the closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart IX, 270.14(b)(13), and 20 NMAC 4.1, Subpart V, 264, Subpart G, I, and X. This section is organized as follows:

- General closure information applicable to the hazardous and/or mixed waste units addressed in this permit application (Section 9.1)
- Closure procedures specific to the container storage area at Technical Area (TA) 16, Building 88 (TA-16-88) (Section 9.2)
- Closure procedures specific to open burn units at TA-16 (TA-16-387, -388, -394, -399, -401, and -406) (Section 9.3)
- Sampling and analytical procedures to be used during closure activities at the units addressed in this permit application (Section 9.4).

Closure activities to be conducted at other units throughout Los Alamos National Laboratory (LANL) are described in LANL's Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility (HWF) Permit, in existing RCRA Part B permit applications, and in interim status closure plans for units that have not yet been or may not be included in permit applications.

Closure will include removal of waste from the open burn units and container storage area to be closed (see Sections 9.2.3, 9.3.3) and decontamination of structures and equipment that have been contaminated by waste materials (see Sections 9.2.4, 9.3.4). Closure activities will minimize the need for further maintenance, preclude the release of hazardous/mixed waste or constituents to environmental media, and be protective of human health.

Radiological exposures during closure activities will be maintained as low as reasonably achievable, as required by the Atomic Energy Act, to protect worker and public health and safety. Until closure is complete and has been certified in accordance with 20 NMAC 4.1, Subpart V, 264.115, a copy of the approved closure plan and all approved revisions will be on file at LANL and will be available to the New Mexico Environment Department (NMED) or the U.S. Environmental Protection Agency (EPA) upon request.

9.1 GENERAL CLOSURE INFORMATION

This section is prepared in accordance with the requirements of 20 NMAC 4.1, Subpart IX, 270.14(b)(13), and 20 NMAC 4.1, Subpart V, 264, Subparts G, I, and X, as applicable.

A copy of the closure plan and any approved revisions will be maintained at LANL. The primary contact person is:

Larry D. Kirkman, Acting Area Manager
Los Alamos Area Office (LAAO)
U.S. Department of Energy
528 35th Street
Los Alamos, New Mexico 87544
Tel. (505) 667-5288

9.1.1 Closure Performance Standard [20 NMAC 4.1, Subpart V, 264.111]

The hazardous and/or mixed waste units described in this permit application will be closed to meet the following performance standards:

- Minimize the need for further maintenance
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous or mixed waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or atmosphere
- Comply with the container management requirements of 20 NMAC 4.1, Subpart V, 264.178, as applicable
- Comply with the miscellaneous unit requirements of 20 NMAC 4.1, Subpart V, 264.601, as applicable.

This will be accomplished by removal of waste from the units and decontamination, if necessary, of the areas that may have come into contact with the wastes. Decontamination activities will ensure the removal of waste residues from the container storage area and the open burn units addressed in this permit application to established cleanup levels (see Sections 9.2.6, 9.3.6).

Closure of any hazardous and/or mixed waste unit will be deemed complete when decontamination has been verified (see Sections 9.2.6, 9.3.6); all equipment and structures associated with operation of the unit have been decontaminated, if necessary; and closure certification has been submitted to and approved by NMED.

9.1.2 Partial and Final Closure Activities [20 NMAC 4.1, Subpart V, 264.112(d)]

This closure plan has been written for implementation of partial closure (i.e., closure of a waste management unit at a facility that contains other active waste management units) rather than final closure of the LANL facility.

Partial closure will consist of closing one or more of the RCRA-regulated waste management units at the LANL facility, while leaving the other RCRA-regulated waste management units at LANL in service. In the event of a partial closure, the procedures described in the following sections will apply to the waste management units addressed in this permit application that are to be closed. Partial closure (hereafter referred to as closure) will be complete when decontamination has been verified (see Sections 9.2.6, 9.3.6); the waste management unit and related equipment and structures have been decontaminated, if necessary; the closure certification has been submitted; and NMED has approved the closure. Final closure will occur when LANL's remaining RCRA-regulated waste management units are closed either by waste removal and decontamination or by closure in place.

9.1.3 Closure Schedule [20 NMAC 4.1, Subpart V, 264.112(b)(6) and 264.113]

Closure will not commence until all of the wastes have been removed from the hazardous and/or mixed waste management unit scheduled to be closed. Closure activities will begin in accordance with the approved closure plan, as required by 20 NMAC 4.1, Subpart V, 264.113(a), within 90 days after final receipt of waste at the waste management unit. In the event that closure activities cannot be completed at the waste management unit within 90 days, LANL will notify the Secretary of NMED in accordance with the extension requirements cited in 20 NMAC 4.1, Subpart V, 264.113(a). Closure activities and reporting requirements will be completed within 180 days of the receipt of the final volume of waste at the waste management unit to be closed. Closure will be conducted in accordance with the schedule presented in Table 9-1. In the event that closure of the waste management unit is prevented from proceeding according to schedule, LANL will notify the Secretary of NMED in accordance with extension request requirements in 20 NMAC 4.1, Subpart V, 264.113(b). In addition, the demonstrations in 20 NMAC 4.1, Subpart V, 264.113(a)(1) and (b)(1), will be made in accordance with 20 NMAC 4.1, Subpart V, 264.113(c).

9.1.4 Amendment of the Closure Plan [20 NMAC 4.1, Subpart V, 264.112(c)]

If it is necessary to amend the closure plan for any hazardous and/or mixed waste management unit addressed in this plan, LANL will submit, in accordance with 20 NMAC 4.1, Subpart V, 264.112(c), a written notification of or a request for a permit modification describing any change in operation or facility design that could affect the closure plan. The written notification or

request will include a copy of the amended closure plan for approval by NMED. The U.S. Department of Energy (DOE) will submit a written notification of or a request for a permit modification to authorize a change in the approved plan if:

- There are changes in operating plans or facility design that affect the closure plan
- Unexpected events occur during closure that require modification of the approved closure plan.

DOE will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in the design or operation of the waste management unit or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. If the Secretary of NMED requests a modification of the closure plan, a plan modified in accordance with the request will be submitted within 60 days of notification or within 30 days of notification if a change in facility condition occurs during final closure.

9.1.5 Financial and Liability Requirements [20 NMAC 4.1, Subpart V, 264.140(c)]

In accordance with 20 NMAC 4.1, Subpart V, 264.140(c), LANL, as a federal facility, is exempt from the requirements to provide financial assurance mechanisms and liability insurance for closure actions.

9.1.6 Closure Certification [20 NMAC 4.1, Subpart V, 264.115]

Within 60 days after completion of closure activities for each of the hazardous and/or mixed waste management units addressed in this permit application, DOE will submit to the Secretary of NMED, via certified mail, a certification that the unit has been closed in accordance with the specifications of the applicable closure plan, when approved. The certification will be attested to by an independent, registered professional engineer and will be signed by the appropriate DOE and LANL officials, in accordance with 20 NMAC 4.1, Subpart V, 264.115. Documentation supporting the independent registered engineer's certification will be furnished to the Secretary of NMED with the original certification. A copy of the certification and supporting documentation shall be maintained by both DOE/LAAO and by LANL's Hazardous and Solid Waste Group (ESH-19).

9.1.7 Security

Because of the nature of operations at TA-16, this site will be under the permanent care of DOE or another authorized federal agency. Fences and site security will be maintained in perpetuity to prohibit public access and to meet DOE requirements for radiation protection.

9.1.8 Quality Assurance/Quality Control

A qualified individual, or individuals, shall be designated to independently oversee the closure activities and to report directly to senior management on the quality of the closure performance. This individual will personally observe a portion of the key activities, assure that sample blanks are used and analyzed, and review the analysis reports for accuracy and adequacy. A written quality assurance (QA)/quality control (QC) plan prepared in accordance with the most current version of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) (EPA, 1992a) and updates I and II (EPA, 1995) shall be prepared and followed, with variations from the plan documented and explained. The designated individual shall prepare a written statement for the final report commenting on the level of decontamination verification achieved.

9.1.9 Closure Report

Upon completion of the closure activities for each hazardous and/or mixed waste management unit addressed in this permit application, a closure report shall be submitted to the Secretary of NMED. The report shall document the closure and contain, at a minimum, the following:

- The certification described in Section 9.1.6
- Any variance from the approved activities and the reason for the variance
- A tabular summary of all sampling results, showing:
  - Sample identification
  - Sampling location
  - The datum reported
  - Detection limit for each datum
  - A measure of analytical precision (e.g., uncertainty, range, variance)
  - Identification of analytical procedure
  - Identification of analytical laboratory.
- A QA/QC statement on analytical data validation and decontamination verification
- The location of the file of supporting documentation, including:
  - Field logbooks
  - Laboratory sample analysis reports
  - QA/QC documentation
  - Chain-of-custody forms.
- Disposition location of RCRA-regulated closure materials
- A certification of accuracy of the report.

9.1.10 Survey Plat and Post-Closure Requirements [20 NMAC 4.1, Subpart V, 264.116, 264.117 through 264.120]

LANL intends to remove hazardous and mixed waste and constituents from the hazardous and/or mixed waste management units to be permitted and to decontaminate all structures and equipment to established cleanup levels. If decontamination to established cleanup levels is not

achievable, LANL will amend this closure plan to address appropriate closure procedures and/or post-closure care requirements pursuant to 20 NMAC 4.1, Subpart V, 264.117 through 264.120.

A survey plat, post-closure certification, and post-closure notices will not be required for the hazardous and/or mixed waste management units to be permitted because all waste will be removed and the areas will be decontaminated at closure. Therefore, these requirements are not applicable.

9.2 CLOSURE PROCEDURES FOR THE CONTAINER STORAGE AREA LOCATED AT TA-16-88 [20 NMAC 4.1, Subpart V, 264.112]

TA-16 operations primarily involve the production of high explosives (HE) for various research and development activities at LANL. Figure 9-1 shows the location of TA-16 at LANL. The container storage area addressed in this section may be used for the storage of hazardous and low-level mixed waste and is located at Building 88 at TA-16 (TA-16-88). The location of TA-16-88 is shown on Figure 9-2. Figure 9-3 shows the location of the container storage area within TA-16-88. A detailed description of the container storage area is provided in Section 4.1 of this permit application.

9.2.1 Estimate of Maximum Waste in Storage

The maximum inventory of waste that may be in storage at any time at the container storage area is estimated at 275 gallons or 2,500 pounds.

9.2.2 Description of Waste

Classified, solid hazardous and mixed waste may be stored at the container storage area at TA-16-88. A detailed description of wastes that may be managed at the container storage area is provided in Section 3a of this permit application.

9.2.3 Removal of Waste

All wastes will be removed from the container storage area at TA-16-88 prior to the initiation of closure activities. Containers may be removed primarily with forklifts. Small containers may be handled manually or with a dolly. Containers may be placed onto flatbed trucks or trailers for transport. All appropriate shipping papers will accompany the wastes during transport. Containers holding RCRA-regulated wastes will be moved to an approved on-site facility or permitted off-site treatment and/or disposal facility.

9.2.4 Closure Procedures and Decontamination

To the extent possible, all contaminated structures and equipment at the container storage area at TA-16-88 will be decontaminated and removed. Structures, equipment, and media that

cannot be decontaminated will be containerized and managed in compliance with appropriate regulations. All sampling conducted during closure and decontamination will be done in accordance with QA/QC procedures (see Section 9.1.8).

Before proceeding with any closure activities, the TA-16-88 container storage area will be surveyed for radiological contamination. Personal protective equipment (PPE) and monitoring requirements will be determined by LANL's Health Physics Operations (ESH-1) and Industrial Hygiene and Safety (ESH-5) groups following a field inspection. Radiation and chemical monitoring will occur throughout closure activities. If any contamination is found, the contaminated material will be decontaminated (if possible) or containerized and taken to an approved storage location at LANL appropriate for the waste type.

Personnel involved in closure activities will wear appropriate PPE, specified by ESH-1 and ESH-5, and follow good hygiene practices to protect employees from exposure to hazardous and/or mixed waste. The level of PPE that will be required will depend upon the levels of radiological and/or chemical contamination that are detected, if any. If ESH-1 and ESH-5 surveys do not indicate detectable contamination levels, minimum PPE requirements will consist of coveralls, steel-toed boots, and safety glasses or face shields. If an overhead danger is present, a hard hat will be worn. All workers involved in closure activities will be required to have training and medical monitoring. Contaminated PPE shall either be decontaminated or managed in compliance with appropriate regulations.

Before decontamination activities begin, two samples of clean water and detergent (wash water) solution squeezed from mops and/or sponges prior to use will be collected for analysis of the parameters listed in Table 9-2 to provide a baseline for decontamination verification. A portable berm will be placed around the perimeter of the container storage area to contain wash water resulting from decontamination activities. The floor of the container storage area and any equipment and/or structures located within the container storage area will then be wiped down with a wash water solution. The floor and any equipment and/or structures will be wiped down with mops and/or sponges to minimize the amount of liquid waste generated as a result of decontamination activities. Wash water resulting from decontamination activities will collect within the bermed area.

Wash water collected in the bermed area of TA-16-88 will be transferred to appropriate containers and sampled. The used wash water will also be analyzed for the parameters listed in Table 9-2. The wash cycles will continue until the floor and any equipment and/or structures in

the area have been cleaned to established levels (see Section 9.2.6). (An additional sample of clean wash water solution squeezed from mops and/or sponges prior to use will be collected for each additional washdown event.) If the used wash water is nonhazardous and nonradioactive, it will be managed appropriately in accordance with LANL policy. Otherwise, the used wash water will be managed at an appropriate on-site facility, depending on the regulated components present.

Soil sampling will be conducted as part of the closure activities to determine if contaminants have migrated from the container storage area. Prior to the initiation of closure activities, background soil samples will be collected near TA-16-88 and analyzed for the parameters listed in Table 9-2. After washdown activities at the container storage area are complete, a statistically representative number of soil samples will be collected from the soil surrounding TA-16-88. Samples will be collected 6 inches from the building's foundation to a depth of 6 inches and equally spaced to ensure that samples are representative of the entire perimeter of the storage area. Samples will be analyzed for the parameters listed in Table 9-2. If contamination is found in any of the soil samples as a result of container storage, the contaminated soil will be removed to statistically significant levels based on concentrations in the background soil samples.

9.2.5 Decontamination Equipment

Prior to use, all decontamination equipment will be rinsed with distilled water. Decontamination equipment rinsate blanks will be collected and analyzed in accordance with QA/QC procedures (see Section 9.1.8). Reusable protective clothing, tools, and equipment used during closure activities will be cleaned with a wash water solution and scraped as necessary to remove any residue. Residue, disposable equipment, and reusable equipment that cannot be decontaminated will be containerized and managed appropriately at an approved on-site facility, depending on the regulated components present. Used wash water will be collected and analyzed for the parameters listed in Table 9-2. If the used wash water is nonhazardous and nonradioactive, the water will be managed appropriately in accordance with LANL policy. Otherwise, it will be managed at an appropriate on-site facility, depending on the regulated components present.

9.2.6 Decontamination Verification

Sufficient sampling and analysis will be required to demonstrate that mixed waste residue is not present at the site after closure. Two samples of clean wash water squeezed from mops and/or sponges prior to use will be collected before initial washdowns of the container storage area. The samples will be analyzed for parameters listed in Table 9-2 to provide baseline data for

decontamination verification. Analytical procedures will conform to methods found in SW-846. Used wash water solutions will also be analyzed for the parameters listed in Table 9-2. Wash water solutions will be considered contaminated if the used wash water solution shows a significant increase (i.e., determined using statistical methods defined in SW-846) in the analytical parameters over the clean wash water solution. If subsequent washdowns are deemed necessary, an additional sample of clean wash water solution squeezed from mops and/or sponges prior to use will be taken for each additional washdown event.

Existing background soil data for TA-16 will also be used to demonstrate that hazardous and/or mixed waste residue resulting from storage activities is not present at the site after closure. A comparison of closure sampling data to existing background soil data will be used to establish the source of any hazardous waste or constituents present in the soil. If hazardous waste or constituents present in the soil samples indicate that contamination is from container storage activities, additional excavations of contaminated soil will be performed until at least one of the decontamination criteria has been met successfully.

Successful decontamination meets one of the following criteria:

- No detectable hazardous waste or constituents from container storage activities are found in the final sample.
- Detectable hazardous waste or constituents from container storage activities in the final sample are removed to statistically significant levels based on baseline concentrations in the clean wash water or established background soil data.
- Detectable hazardous waste or constituents from container storage activities in the final sample are at or below levels negotiated with NMED.
- Detectable hazardous waste or constituent concentrations from container storage activities do not significantly decrease after several washdowns.

9.3 CLOSURE PROCEDURES FOR THE OPEN BURN UNITS AT TA-16 (TA-16-387, -388, -394, -399, -401, and -406) [20 NMAC 4.1, Subpart V, 264.112]

Units used to burn high-explosives (HE) waste at TA-16, as shown on Figure 9-4, include three general types. The first type of open burn unit consists of a sand pad on which HE or HE-contaminated equipment are placed and remotely burned. There are three such pads at TA-16, measuring 30- by 30-feet (ft) square. Each pad is located at the center of a 100- by 100-ft square area enclosed by a cyclone fence. The surfaces of the pads slope from the center to the edge. These are dedicated to wastes that can be burned without detonation, although unplanned detonations have occurred. These units at TA-16 include a flash pad, designated as TA-16-387, and two burn pads, designated as TA-16-388, and TA-16-399.

The second type of open burn unit at TA-16 consists of a concrete, brick-lined, sand-filled burn tray on which two smaller metal pans are located. Waste HE-contaminated fluids are poured into the smaller pans and the HE is remotely ignited. This unit at TA-16 is designated as TA-16-394.

The third type of open burn unit at TA-16 is used to burn HE-contaminated wastewater sludges. These units consist of steel cone-shaped vessels having a diameter of about eight feet, buried with only the upper three to four feet of the vessel above ground. The steel vessels are filled with sand and gravel and an open fluids drain is located at the bottom of the cone. HE wastewater sludge is gravity fed from vacuum trucks into the top of the cone, onto the sand and gravel bed. A heavy steel cap is then placed over the top of the cone and hot air is forced into the cone through air ducts. The hot air dries the waste sludge and liquids from the sludge filter downward through the sand and gravel bed and through the fluids drain. Effluent from these drains is regulated by a National Pollutant Discharge Elimination System permit (NMR00A384). When the remaining explosive material is relatively free of moisture, the steel cap is removed from the cone and the filter surface residue is ignited remotely. Two units of this type at TA-16 referred to as filter vessels are designated as TA-16-401 and TA-16-406.

The modifications to the flash pad (TA-16-387) and the burn tray (TA-16-394), described in Section 4.0 of this permit application, will not take place until baseline characterization samples of these areas have been taken. This sampling will be conducted according to a plan developed by the Engineering Sciences and Applications (ESA) Division and ESH-19.

9.3.1 Estimate of Maximum Waste in Storage

Waste that may be treated at the TA-16 open burn units is held at satellite accumulation areas at the point of generation prior to treatment. The maximum waste that may be treated at one time is approximately 1,000 pounds (454 kilograms). Residual barium-contaminated sand may be held in temporary storage (less than 90 days) in drums at the open burning units.

9.3.2 Description of Waste

The flash pad (TA-16-387) and the burn pads (TA-16-388 and TA-16-399) are used to treat scrap HE and equipment and trash that have contacted HE and are considered to be contaminated. HE that has been burned include cyclotetramethylenetetramine (HMX), cyclonite (RDX), 2, 4, 6-trinitrotoluene (TNT), pentaery-thritol tetranitrate (PETN), ammonium nitrate, barium nitrate, triaminotrinitrobenzene (TATB), nitrocellulose, tetryl, nitroguanidine, and various plastic binders. These wastes are transferred to the site by trucks. Trash and HE scrap are containerized. Large equipment is wrapped to ensure containment.

The burn tray (TA-16-394) handles waste oils and solvents that are considered to be contaminated with HE. Small volumes are handled in metal containers, and the contents are poured by hand into the burn pans.

The waste handled at the filter vessels (TA-16-401 and TA-16-406) is HE-contaminated wastewater delivered to the site with a vacuum truck and drained from the truck through a hose into the vessel.

Burning HE material wastes can leave a residual material that is toxic for barium. The concentration of barium in the residual material varies with the concentration of barium nitrate in the waste.

9.3.3 Removal of Waste

All wastes will be removed from the open burn unit scheduled to be closed prior to the initiation of closure activities. Containers and packaged waste may be removed from the unit with container-handling equipment. Small containers may be handled manually or with a dolly. Flatbed trucks or trailers may be used for transport of the wastes. All appropriate shipping papers will accompany the wastes during transport. RCRA-regulated wastes will be moved to an approved on-site facility or permitted off-site treatment and/or disposal facility.

9.3.4 Closure Procedures and Decontamination

To the extent possible, all contaminated structures and equipment at the open burn units addressed in this section will be decontaminated and removed. Structures, equipment, and media that cannot be decontaminated will be containerized and managed in compliance with appropriate regulations. All sampling conducted during closure and decontamination procedures will be done in accordance with QA/QC procedures (see Section 9.1.8).

Before proceeding with any closure activities, the units and all associated structures and equipment will be surveyed for radiological contamination. PPE and monitoring requirements will be determined by ESH-1 and ESH-5 following a field inspection. Radiation and chemical monitoring will occur throughout closure activities. If any contamination is found, the contaminated material will be decontaminated (if possible) or containerized and taken to an approved storage location at LANL appropriate for the waste type.

Personnel involved in closure activities will wear appropriate PPE and will follow good hygiene practices to protect employees from exposure to hazardous waste. The level of PPE will

depend upon the level of chemical contamination detected, if any. Minimum PPE requirements will consist of coveralls, steel-toed boots, and safety glasses or face shields. If an overhead danger is present, a hard hat will be worn. All workers involved in closure activities will be required to have training and medical monitoring. Contaminated PPE will either be decontaminated or managed in compliance with appropriate regulations.

Before decontamination activities begin, two samples of clean water and detergent (wash water) solution squeezed from mops and/or sponges prior to use will be collected for analysis of the parameters listed in Table 9-2 to provide a baseline for decontamination verification. Then any equipment and/or structures located at the open burn unit will be wiped down with a wash water solution. Mops and/or sponges will be used to minimize the amounts of liquid waste generated as a result of decontamination activities. Portable berms and/or other containment structures will be used to contain any wash water that is generated as a result of decontamination activities. Wash water resulting from decontamination activities will collect within the bermed area or other containment structures.

Wash water collected from within the bermed area or other containment structures will be transferred to appropriate containers and sampled. The used wash water will also be analyzed for the parameters listed in Table 9-2. The wash cycles will continue until the structures and equipment at each unit have been cleaned to established levels (see Section 9.3.6). (One additional sample of clean wash water solution squeezed from mops and/or sponges prior to use will be collected for each additional washdown event.) If the used wash water is nonhazardous and nonradioactive, it will be managed appropriately in accordance with LANL policy. Otherwise, the used wash water will be managed at an appropriate on-site facility, depending on the regulated components present.

Soil and sand sampling will be conducted as part of the closure activities to determine if contaminants have migrated from the open burn units. Prior to the initiation of closure activities, background soil samples will be collected in the vicinity of the open burn units and analyzed for the parameters listed in Table 9-2. After washdown activities are completed, a statistically representative number of soil and/or sand samples will be collected from the area constituting and surrounding the burn units, as appropriate. Initial samples will be collected to a depth of 6 inches and will be spaced to ensure that samples are representative of the entire area covered by the open burn unit as well as other areas in the vicinity that may have been affected by treatment operations at the burn units. Sampling will be conducted by the methods described in Section 9.4. Samples will be analyzed for the parameters listed in Table 9-2. If contamination is

found in any of the soil/sand samples as a result of open burning, the contaminated soil/sand will be removed to statistically significant levels based on concentrations in the background soil samples.

9.3.5 Decontamination Equipment

Prior to use, all decontamination equipment will be rinsed with distilled water. Decontamination equipment rinsate blanks will be collected and analyzed in accordance with QA/QC procedures (see Section 9.1.8). Reusable protective clothing, tools, and equipment used during closure activities will be cleaned with a wash water solution and scraped as necessary to remove any residue. Residue, disposable equipment, and reusable equipment that cannot be decontaminated will be containerized and managed appropriately at an approved on-site facility, depending on the regulated components present. Used wash water will be collected and analyzed for the parameters listed in Table 9-2. If the used wash water is nonhazardous and nonradioactive, the water will be managed appropriately in accordance with LANL policy. Otherwise, it will be managed at an appropriate on-site facility, depending on the regulated components present.

9.3.6 Decontamination Verification

Sufficient sampling and analysis will be required to demonstrate that hazardous waste residue is not present at the site after closure. Two samples of clean wash water solution squeezed from mops and/or sponges prior to use will be collected before initial washdown of the equipment and structures located at the open burn unit. The samples will be analyzed for parameters listed in Table 9-2 to provide baseline data for decontamination verification. Analytical procedures will conform to methods found in SW-846. Used washdown solutions will also be analyzed for the parameters listed in Table 9-2. Washdown solutions will be considered contaminated if the used wash water solution shows a significant increase (i.e., determined using statistical methods defined in SW-846) in the analytical parameters over the clean wash water solution. If subsequent washdowns are deemed necessary, an additional sample of clean wash water solution squeezed from mops and/or sponges prior to use will be taken for each additional washdown event.

Existing background soil data for TA-16 will also be used to demonstrate that hazardous waste residue resulting from open burn activities is not present at the site after closure. A comparison of closure sampling data to existing background soil data will be used to establish the source of any hazardous waste or constituents present in the soil. If the data comparison indicates that contamination is from the open burn activities, additional contaminated soil excavations will be performed until at least one of the following decontamination criteria has been met:

- No detectable hazardous waste or constituents from open burn activities are found in the final sample.
- Detectable hazardous waste or constituents from open burn activities in the final sample are removed to statistically significant levels based on baseline concentrations in the clean wash water or established background soil data.
- Detectable hazardous waste or constituents from open burn activities in the final sample are at or below levels negotiated with NMED.
- Detectable hazardous waste or constituent concentrations from open burn activities do not significantly decrease after several washdowns.

9.4 SAMPLING AND ANALYTICAL PROCEDURES [20 NMAC 4.1, Subpart V, 264.112(b)(4)]

The following sections describe procedures and methods for sampling, analysis, and documentation applicable to closure activities. While the procedures and methods are specific, other applicable procedures or methods given in SW-846 may be used if conditions or experience show the alternate method to be more appropriate. All sampling and analytical procedures actually used will be annotated in the final closure report. Sampling will be conducted in accordance with procedures given in SW-846 (for hazardous components) and LANL's Inorganic Trace Analysis Group (CST-9) procedures (for radiological analysis).

9.4.1 Soil, Ash, and Sand Sampling

Soil sampling will be conducted at each of the hazardous and/or mixed waste management units addressed in this plan. The soil samples will be collected to determine if contaminants have migrated from the respective units. Ash and sand will be collected from the burn units, as applicable, to determine appropriate waste management practices for the ash and the sand.

9.4.1.1 Sampling Procedures

The sampling procedures outlined below will be used to obtain samples to determine the amount of RCRA constituents in soil, ash, and sand associated with the units undergoing closure. Soil samples will be collected from the 6-inch depth with a trowel or scoop or with a Veihmeyer soil sampler. Ash and sand samples will be collected with a trowel or scoop. Sampling procedures will be performed as follows:

- Trowel or Scoop
  - Take small, equal portions of sample from the surface or near the surface of the material to be sampled.
  - Combine the samples in a container appropriate for the required analysis.
  - Cap the container, attach a label and seal, and preserve as required (see Table 9-3). Record in the field logbook, and complete the sample analysis request sheet and chain-of-custody form. Deliver the samples to CST-9 for radiological screening and to the laboratory for analysis.

- Veihmeyer Sampler
  - Assemble the sampler by screwing in the tip and drive head on the sampling tube.
  - Insert the tapered handle (drive guide) of the drive hammer through the drive head.
  - Place the sampler in a perpendicular position on the soil to be sampled.
  - With the left hand holding the tube, drive the sampler into the soil to the desired sampling depth by pounding the drive head with the drive hammer. Do not drive the tube further than the tip of the hammer's drive guide.
  - Record the length of the tube that penetrated the material.
  - Move the drive hammer onto the drive head. In this position, the hammer serves as a handle for the sampler.
  - Rotate the sampler at least two revolutions to shear off the sample at the bottom.
  - Lower the sampler handle (hammer) until it just clears the two ear-like protrusions on the drive head and rotate about 90 degrees.
  - Withdraw the sampler from the material by pulling the handle (hammer) upwards. When the sampler cannot be withdrawn by hand, as in deep soil sampling, use a puller jack and grip.
  - Dislodge the hammer from the sampler, turn the sampler tube upside down, tap the head gently against the hammer, and carefully recover the sample from the tube. The sample should slip out easily.
  - Store the sample in an appropriate sample container.
  - Label the sample, affix the seals, preserve as required (see Table 9-3), record in the field logbook, complete the sample analysis request sheet and chain-of-custody form, and deliver the samples to CST-9 for radiological screening and to the laboratory for analysis.

9.4.1.2 Cleaning of Samplers

To prevent cross contamination, it is important to clean the samplers after each sample is collected. An unused, disposable sampler may be presumed clean if still in a factory-sealed wrapper. Unsealed samplers will be cleaned prior to use. The samplers will be washed with a detergent and water solution, rinsed several times with tap water, rinsed with distilled water, drained of excess water, and air-dried or wiped dry.

9.4.2 Liquid Sampling

A coliwasa or similar device will be used to sample unused wash water solutions before decontamination begins in order to determine baseline parameters. It will also be used to sample the wash water used in cleaning structures and equipment. As an alternative to the coliwasa, glass tubes may be used to sample liquids. The primary advantage in using a glass tube is that the tube will be disposed of appropriately after each sample is collected, thus eliminating the potential for cross contamination.

9.4.2.1 Sampling Procedure

Liquid sampling with a coliwasa will be performed as follows:

- Ensure that the coliwasa is clean.
- Assemble the coliwasa.
- Check that the sampler is functioning properly. Adjust the locking mechanism, if necessary, to make sure the neoprene rubber stopper provides a tight closure.
- Wear necessary protective clothing and gear, and observe required sampling precautions.
- Put the sampler in the open position by placing the stopper-rod handle in the T-position and pushing the rod down until the handle sits against the sampler's locking block.
- Slowly lower the coliwasa into the liquid at a rate that permits the level of the liquid inside and outside the sampler tube to be about the same. If the level of the liquid in the sampler tube is lower than that outside the sampler, the sampling rate is too fast and will result in a nonrepresentative sample.
- When the sampler stopper hits the bottom of the liquid container, push the sampler tube downward against the stopper to close the sampler. Lock the sampler in the closed position by turning the T-handle until it is upright and one end rests tightly on the locking block.
- Slowly withdraw the sampler from the container with one hand, while wiping the sampler tube with a disposable cloth with the other hand.
- Carefully discharge the sample into a sample container by slowly opening the sampler. This is done by slowly pulling the lower end of the T-handle away from the locking block, while the lower end of the sampler is positioned in the sample container.
- Preserve as required (see Table 9-4), cap the container, attach a label and seal, place immediately in an insulated container with ice (if required), record in the field logbook, and complete the sample analysis request sheet and chain-of-custody form.
- Unscrew the T-handle of the sampler and disengage the locking block. Clean the sampler on site, or store the contaminated parts of the sampler in a plastic storage tube or bag for subsequent cleaning. Store used rags in plastic bags for subsequent disposal.

9.4.2.2 Cleaning of Samplers

The sampler must be clean before use. An unused, disposable sampler may be presumed clean if still in a factory-sealed wrapper. Unsealed samplers will be cleaned prior to use. Samplers will be washed with a detergent and water solution, rinsed several times with tap water, rinsed with distilled water, drained of excess water, and air-dried or wiped dry. A necessary piece of equipment for cleaning the tube of the coliwasa is a bottle brush that fits tightly inside the diameter of the tube. The brush is connected to a rod of sufficient length to reach the entire length of the sampler tube. Improper cleaning of sampling equipment will cause

cross contamination of samples. Clean samplers should be stored in clean polyethylene plastic tubes or bags in a clean and protected area.

9.4.3 Sample Handling and Documentation

Samples will be analyzed either at LANL or at a commercial laboratory. In either case, each sample will be labeled, sealed, and accompanied by a chain-of-custody and sample analysis request form. The chain-of-custody form is necessary to trace sample possession from the time of collection to the time of analysis and must accompany every sample. The original record accompanies shipment. The copy is retained by LANL. If samples are analyzed at LANL, the original will be maintained by LANL. The request for analysis form has two parts: field and laboratory. The field portion of this form must be completed by the person collecting the sample and include most of the pertinent information noted in the logbook. The laboratory portion is intended to be completed by the analytical laboratory personnel when the sample is received. The analytical laboratory retains the original record and sends a copy to LANL.

Sample containers appropriate for the requested analyses will be used for all samples. Sample containers, preservation, and holding times will conform to those specified in SW-846 for the corresponding analyses. Samples will be taken, placed in bottles, sealed, and tagged. Sample container surfaces will be screened for radiological contamination and decontaminated, if necessary. Sample containers will then be immediately packed in vermiculite, sawdust, or if refrigeration is required, an insulated container with ice. Recommended sample containers, preservation, and holding times are presented in Tables 9-3 and 9-4.

The sample container must be sealed with a gummed paper seal attached to the container in such a way that the seal must be broken in order to open the container. The seal and sample tag must be completed with a waterproof pen. A sample label is necessary to prevent misidentification of samples and should include, if applicable, the grid number referenced to positions staked on the site perimeter. The sample label must be completed to include the project name, sample number, collection date/time, collector's name, sample location, sample media description, preservative, and analysis requested. In the case of soil sampling, field information shall include observations such as the soil texture and surface appearance, ambient temperature and cloud cover at time of sampling, and precipitation conditions 24 hours before sampling.

A field logbook will be kept and will contain all information pertinent to field surveys and sampling. The logbook shall have bound and consecutively numbered pages in 8 1/2- by 11-inch format. Minimum entries should include:

- Purpose of sample (routine sampling, special sampling)
- Location of sampling (coordinates referenced to staked field points, if soil sample)
- Name and business address of person making log entry
- Type of process producing waste
- Number and volume of sample
- Description of each sampling location, sampling methodology, equipment used, etc.
- Date and time of sample collection
- Sample destination and transporter's name (e.g., name of laboratory, United Parcel Service, etc.)
- Map or photograph of the sampling site, if any
- Field observations, if applicable (e.g., ambient temperature, sky conditions, past 24-hour precipitation)
- Field measurements, if applicable (e.g., pH, conductivity)
- Collector's sample identification number(s)
- Signature of person responsible for the log entry.

Because sampling situations vary widely, no general rule can be given as to the extent of information that must be entered in the logbook. It is recommended, however, to record sufficient information so that someone can reconstruct the sampling situation without relying on the collector's memory.

9.4.4 Analytical Procedures

All sample analyses will be conducted using methods prescribed in SW-846, including those for QA/QC. Target detection limits, analytical methods, and instrumentation for metals and organics analyses are presented in Tables 9-5 and 9-6.

9.4.5 Field and Laboratory QA/QC

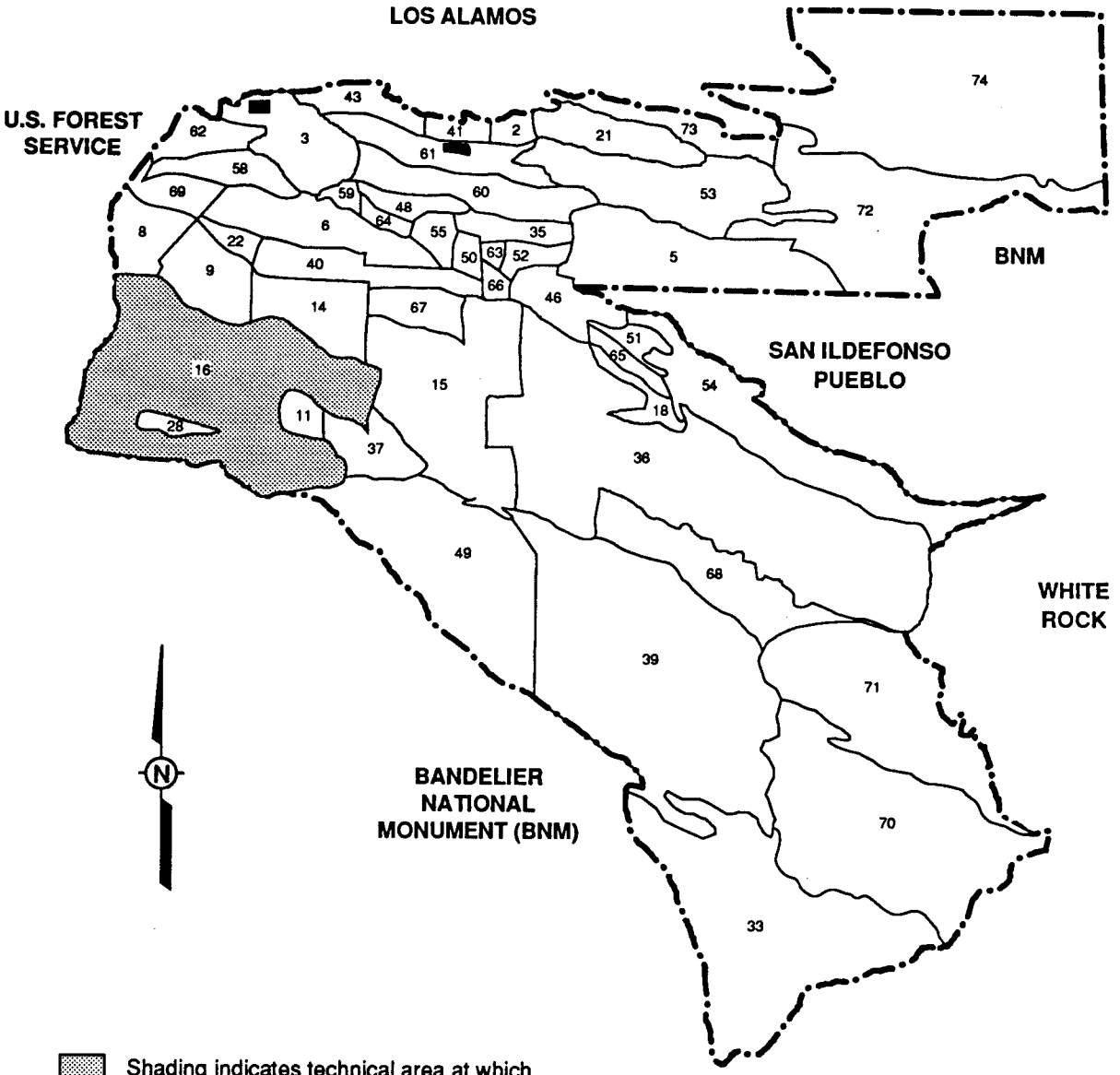
Field QC activities will include collection of the following QC samples: duplicate samples, trip blanks, field blanks, and equipment rinsate blanks. Field QC samples are summarized in Table 9-7.

Duplicate samples are two or more samples collected simultaneously into separate containers from the same source under identical conditions. Acceptance limits for field duplicate analyses are 0 to 20 relative percent difference per analyte. Frequency of duplicate samples will be no

less than 1 per day and 1 in 20 samples. Blank samples will include trip blanks, field blanks, and equipment rinsate blanks. A trip blank is a sample container filled with organic-free deionized water. The filled container is taken to the sampling site, remains unopened, and then is shipped to the analytical laboratory along with the samples. A trip blank is submitted whenever samples are collected for volatile organic compounds analysis. A field blank is a sample collected to assess the ambient conditions at the sampling site. It consists of a sample of organic-free deionized water poured into a sample container under normal sampling conditions. An equipment rinsate blank is collected to assess the cleanliness of sampling equipment. The equipment is cleaned according to the procedures described in Sections 9.4.1.2 and 9.4.2.2, then organic-free deionized water is poured over the decontaminated equipment's sampling surface and collected in a sample container. Frequency of blank samples will be no less than 1 per day and 1 in 20 samples. Blank samples and duplicate samples of liquid, soil, ash, and sand will be analyzed for the same parameters as the closure samples. Samples will be provided with unique identification numbers that do not indicate to the laboratory that the samples are for QA/QC purposes.

Instrument calibration and maintenance are field activities subject to QC procedures. Field equipment requiring calibration will be limited to radioactivity detection devices and organic vapor monitoring equipment. Radiation detection and organic vapor monitoring equipment are the responsibility of field personnel and will be calibrated and maintained using the manufacturer's instructions and appropriate standard operating procedures.

The analytical laboratory shall operate under a quality assurance program plan (QAPP) which meets the requirements in SW-846. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. In the laboratory, QC samples are required to establish the accuracy and precision of the analytical data in order to determine the quality of the data. Laboratory QC procedures are summarized in Table 9-8.



Shading indicates technical area at which hazardous waste and/or mixed waste units are located.

Not Los Alamos National Laboratory property.

4800 0 4800
Scale in Feet

Note: Technical Area 57, the Fenton Hill Geothermal Site, is not shown on this figure.

Modified from Los Alamos National Laboratory, 1994, "Environmental Surveillance at Los Alamos During 1992," LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Figure 9-1

Technical Area Where Hazardous and/or Mixed Waste Units Addressed in the Closure Plan are Located

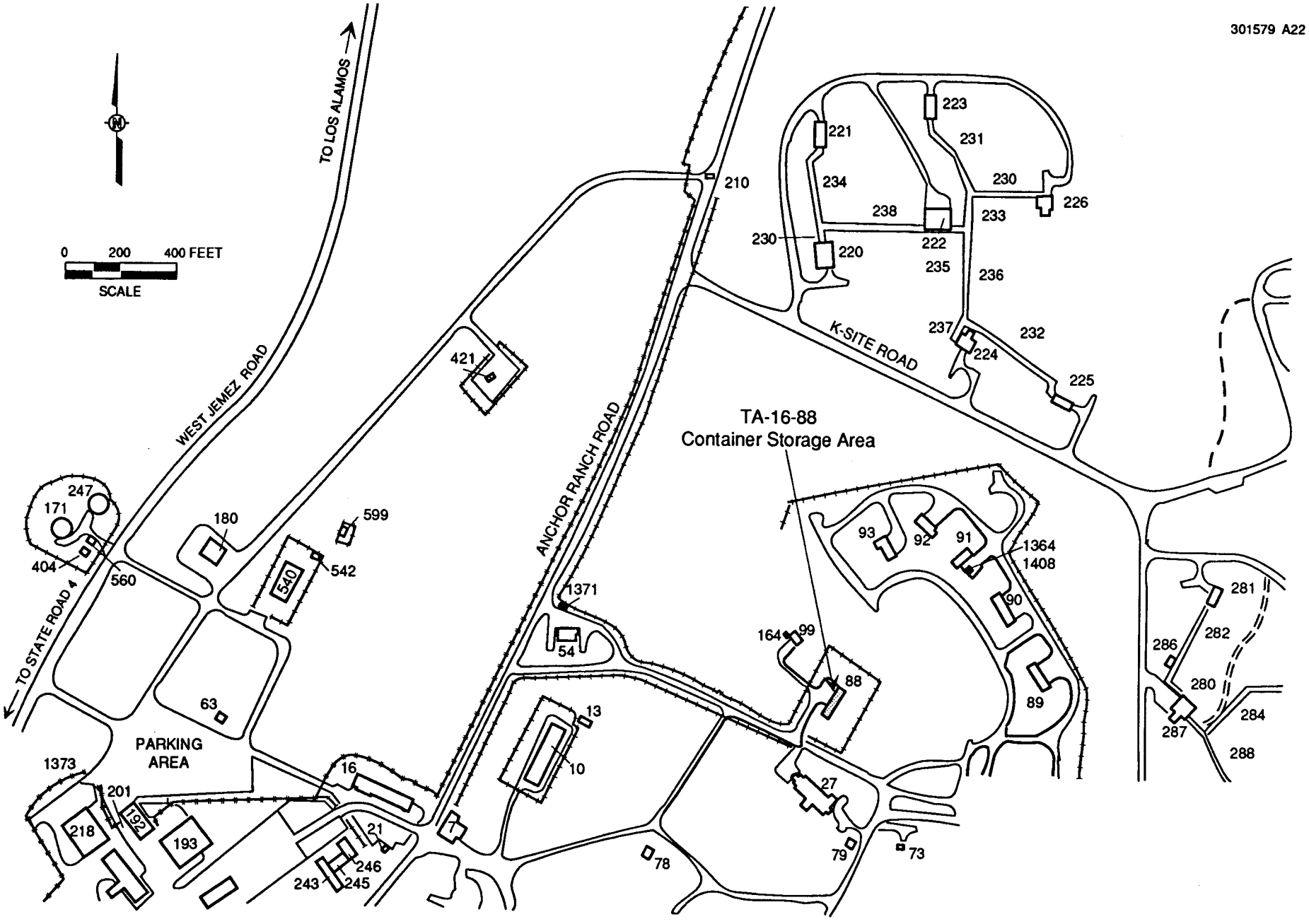
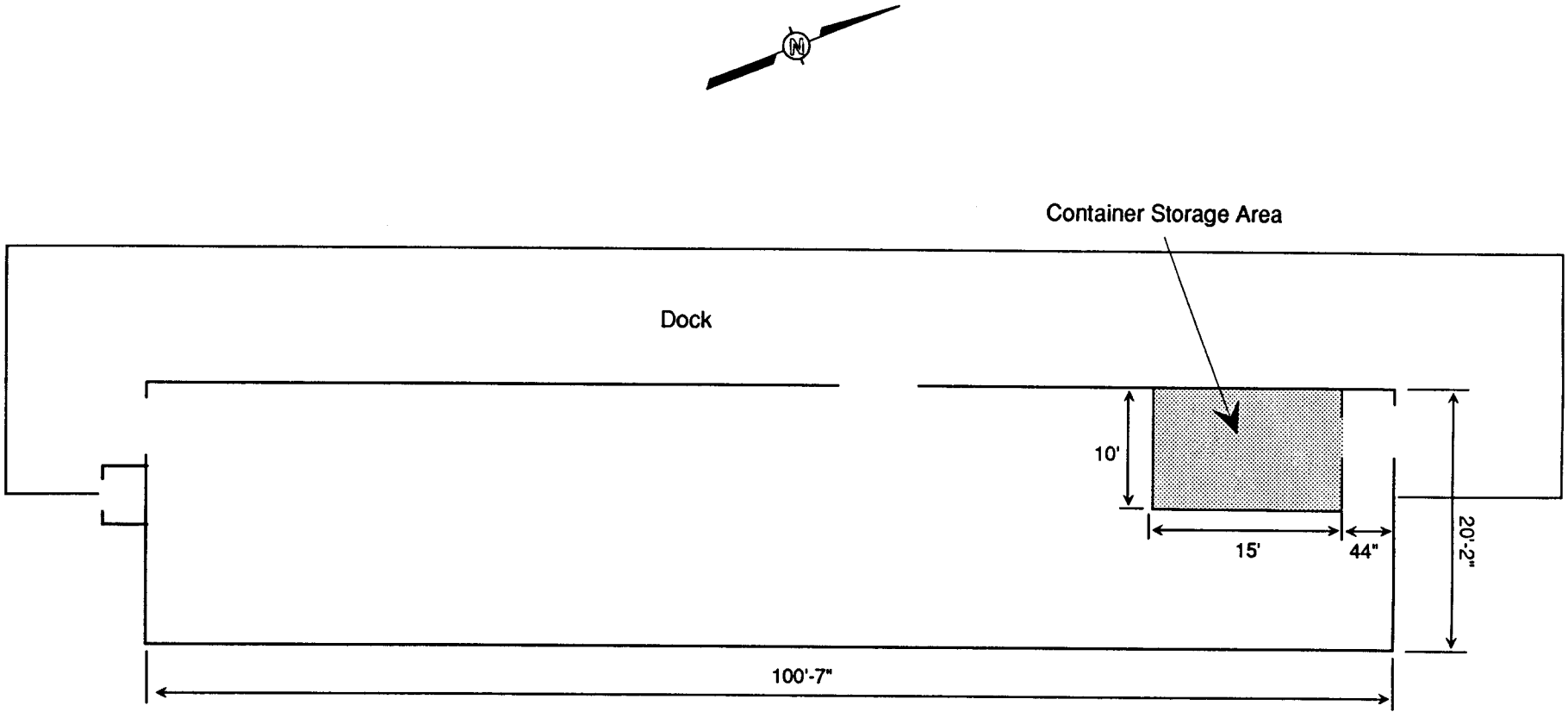


Figure 9-2
Site Location Plan for Technical Area (TA)16, Building 88, Container Storage Area

301579 A43



NOT TO SCALE

Figure 9-3
Technical Area 16, Building 88, Container Storage Area

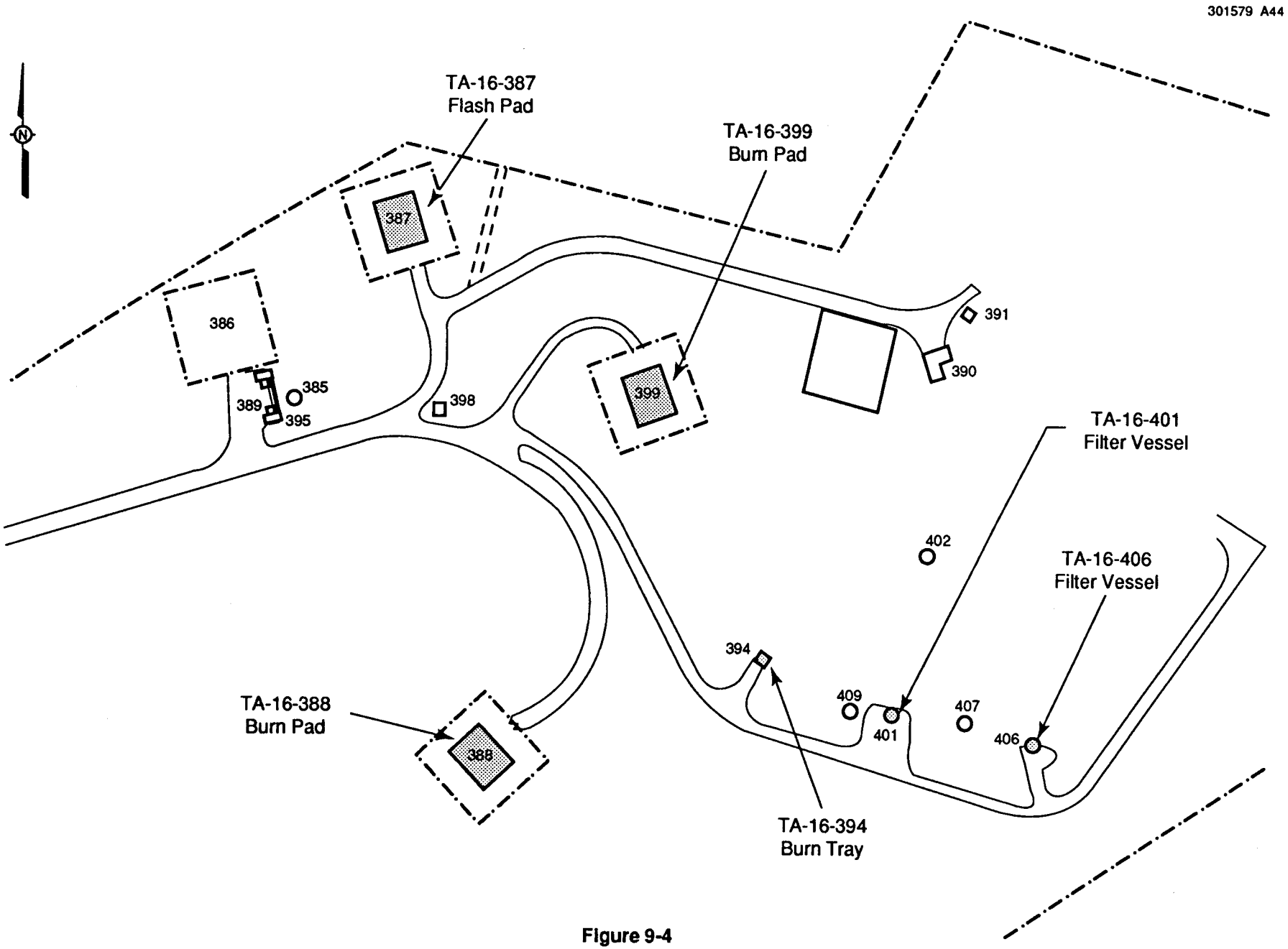


Figure 9-4
Simplified Schematic of Burn Ground at Technical Area (TA) 16

Table 9-1

Closure Schedule for Technical Area 16, Container Storage Area and Open Burn Units

Activity	Maximum Time Required[a]
Let contract request for proposals	-90 Days
Notify the New Mexico Environment Department (NMED)	-45 Days
Receive proposals	-30 Days
Select contractor and award contract	-10 Days
Collect background samples	-5 Days
Final receipt of waste	Day 0
Begin closure activities (perform washdown of structures and/or equipment)	Day 10
Perform initial sampling of the waste management unit	Day 15
Analyze samples	Day 45
Perform additional washdown (if necessary)	Day 50
Perform additional sampling (if necessary)	Day 60
Analyze samples (if necessary)	Day 90
Perform final cleanup (e.g., removal of decontaminated equipment and decontamination wastes)	Day 120
Verify decontamination	Day 150
Submit final report to NMED	Day 180

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed.

Table 9-2

Analytical Parameters and Test Methods[a]

Parameter	Test Method	Reference[b]
Ignitability	Pensky-Martens closed-cup method	(L) SW1010 (L) ASTM D93-80
Reactivity	Test method to determine hydrogen cyanide released from waste Test method to determine hydrogen sulfide released from waste	(L,S) SW Section 7.3
Corrosivity	Electrometric (pH of aqueous solution)	(L) SW9040A
Toxicity characteristic:	Toxicity characteristic leaching procedure (TCLP) extraction and graphite furnace atomic absorption (AA) spectroscopy, gaseous hydride AA, or direct aspiration AA	(S) Method SW1311
Arsenic		(L,S) SW7060A, SW7061A
Barium		(L,S) SW7080A, SW7081
Cadmium		(L,S) SW7130, SW7131A
Chromium		(L,S) SW7190, SW7191
Lead		(L,S) SW7420, SW7421
Selenium		(L,S) SW7740, SW7741A
Silver		(L,S) SW7760A, SW7761
Mercury	TCLP extraction or dissolution steps and manual cold-vapor technique	(L,S) SW7470A, (S) SW7471A
Volatile organics	TCLP extraction and gas chromatography/ mass spectrometry (GC/MS)	(L,S) SW8240B
	GC/MS capillary column technique	(L,S) SW8260A
Semivolatile organics	TCLP and GC/MS	
	packed column technique	(L,S) SW8250A
	GC/MS capillary column technique	(L,S) SW8270B
Organochlorine pesticides	TCLP extraction and GC	(L,S) SW8080A
Chlorinated herbicides		(L,S) SW8150B

Refer to footnotes at end of table.

Table 9-2 (Continued)

Analytical Parameters and Test Methods[a]

Parameter	Test Method	Reference[b]
Total metals[c]	Acid digestion Inductively coupled plasma emission spectroscopy	(L) SW3010A, (S) SW3050A (L,S) SW6010A
Arsenic		(L,S) SW6010A
Barium		(L,S) SW6010A
Beryllium		(L,S) SW6010A
Cadmium		(L,S) SW6010A
Chromium		(L,S) SW6010A
Lead		(L,S) SW6010A
Nickel		(L,S) SW6010A
Selenium		(L,S) SW6010A
Silver		(L,S) SW6010A
Thallium		(L,S) SW6010A
Zinc		(L,S) SW6010A
Mercury	Manual cold-vapor technique	(L) SW7470A (S) SW7471A
Free liquids	Paint Filter Liquids Test	(S) SW9095

a At Los Alamos National Laboratory, current analytical capabilities include limited analyses of mixed waste samples. These analyses include gross alpha, beta, and gamma screening.

b "ASTM" refers to American Society for Testing and Materials standards.
"SW" refers to U.S. Environmental Protection Agency, 1992, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
(L) refers to liquid waste.
(S) refers to solid waste.
See 55 *Federal Register* 11863.

c See also atomic absorption methods listed under TCLP.

Table 9-3

Sample Containers, Preservation, and Holding Times for Soil/Ash/Sand Samples

Analyte Group	Container	Preservative	Holding Time[a]
Target compound volatile organics[b]	8 ounce (oz.) WM[c]-G[d]	Cool to 4°Celsius (C)	14 days from field collection to toxicity characteristic leaching procedure (TCLP) extraction; 14 days from preparative extraction to determinative analysis
Target compound semivolatile organics[b]	2 x 120 milliliter (ml) G vial Teflon™-lined cap	Cool to 4°C	14 days from field collection to TCLP extraction; 7 days from TCLP extraction to preparative extraction; 40 days from preparative extraction to determinative analysis
Target analyte metals[b] (except mercury)	8 oz. WM-G	Cool to 4°C	180 days from field collection to TCLP extraction; 180 days from preparative extraction to determinative analysis
Mercury	1 liter P[e]	HNO_3[f] to pH <2	28 days from field collection to TCLP extraction; 28 days from preparative extraction to determinative analysis
Radioactivity screening	120 ml G vial	None	Analyze upon receipt

a Holding time information was taken from the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, 261, Appendix II.
b Target compound volatile and semivolatile organics and target analyte metals are listed by respective test method numbers in U.S. Environmental Protection Agency, 1992, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
c WM = Wide-mouth
d G = Glass
e P = Polyethylene
f HNO_3 = Nitric acid

Table 9-4

Sample Containers, Preservation, and Holding Times for Liquid Samples

Analyte Group	Container	Preservative	Holding Time[a]
Target compound volatile organics[b]	2 x 40 milliliter (ml) AG[c] septa vials	HCl[d], Cool to 4 degrees Celsius (°C)	14 days from field collection to toxicity characteristic leaching procedure (TCLP) extraction; 14 days from preparative extraction to determinative analysis
Target compound semivolatile organics[b]	2 x 1 liter AG	Cool to 4°C	14 days from field collection to TCLP extraction; 7 days from TCLP extraction to preparative extraction; 40 days from preparative extraction to determinative analysis
Target analyte metals[b] (except mercury)	1 liter P[e]	HNO_3[f] to pH <2	180 days from field collection to TCLP extraction; 180 days from preparative extraction to determinate analysis
Mercury	1 liter P	HNO_3 to pH <2	28 days from field collection to TCLP extraction; 28 days from preparative extraction to determinative analysis
Radioactivity screening	40 ml G[g] vial, no septa	None	Analyze upon receipt

a Holding time information was taken from the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, 261, Appendix II.
b Target compound volatile and semivolatile organics and target analyte metals are listed by respective test method numbers in U.S. Environmental Protection Agency, 1992, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
c AG = Amber glass
d HCl = Hydrochloric acid
e P = Polyethylene
f HNO_3 = Nitric acid
g G = Glass

Table 9-5

Target Detection Limits, Analytical Methods, and Instrumentation for Metals Analysis

Analyte	Target Detection[a] Limit (µg/L)[b]	EPA SW-846[c] Analytical Method	Instrumentation[d]
Arsenic	10	6010A, 7060A, 7061A	ICP, GFAA
Barium	200	6010A, 7080A, 7081	ICP, FLAA, GFAA
Beryllium	5	6010A, 7090, 7091	ICP, FLAA, GFAA
Cadmium	2	6010A, 7130, 7131A	ICP, FLAA, GFAA
Chromium	10	6010A, 7190, 7191	ICP, FLAA, GFAA
Lead	5	6010A, 7420, 7421	ICP, FLAA, GFAA
Mercury	0.2	7470A, 7471A	CVAA
Nickel	40	6010A, 7520	ICP, FLAA
Selenium	5	6010A, 7740, 7741A	ICP, GFAA
Silver	10	6010A, 7760A, 7761	ICP, FLAA, GFAA
Thallium	10	6010A, 7840, 7841	ICP, FLAA, GFAA

[a] Detection limits listed are for clean water. Actual detection limits may be higher depending on sample composition and matrix type.
[b] µg/L = micrograms per liter.
[c] U.S. Environmental Protection Agency, 1992, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
[d] ICP = Inductively coupled plasma emission spectroscopy
GFAA = Graphite furnace atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
CVAA = Cold-vapor atomic absorption spectroscopy

Table 9-6

Target Detection Limits, Analytical Methods, and Instrumentation for Organics Analysis

Analyte (Group)	Target Detection Limits[a]	EPA SW-846[b] Analytical Method	Instrumentation[c]
Target compound list volatiles plus ten tentatively identified compounds (TIC)	10 mg/L[d] water 10-120 mg/kg[e] sediment	8240B or 8260A	GC/MS
Target compound list semivolatiles plus 20 TICs	10 mg/L water 330-50,000 mg/kg sediment	8250A or 8270B	GC/MS

[a] Detection limits expressed as practical quantitation limits.
[b] U.S. Environmental Protection Agency, 1992, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
[c] GC/MS = Gas chromatography/mass spectrometry
[d] mg/L = milligrams per liter.
[e] mg/kg = milligrams per kilogram.

Table 9-7

Summary of Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analysis	Frequency	Purpose	Acceptance Criteria	Corrective[a] Action
Trip blank	Water	Volatiles	One set per shipping cooler containing samples	Monitor sample contamination in field and laboratory	b	Advisory-no action required
Field blank	Water	Volatiles, semivolatiles, pesticides, metals, radionuclides	One sample daily per analysis (can prepare and hold pending sample results)	Monitor field sample contamination/air contamination	b,c	Advisory-no action required
Field duplicate	Soil/water	Volatiles, semivolatiles, pesticides, metals, radionuclides	One for every 20 samples	Monitor sample variability	Analytical method criteria, if applicable	Advisory-no action required
Equipment rinsate blank	Water	Volatiles, semivolatiles, pesticides, metals, radionuclides	One sample per day (can prepare and hold pending sample results)	Monitor decontamination effectiveness and sample cross contamination	b,c	Advisory-no action required

a U.S. Environmental Protection Agency Functional Guidelines for Data Validation may apply.

b For volatile and semivolatile analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

c For pesticides analysis, if blank shows detectable level of any contaminant, sample must exhibit that contaminant at a level 5 times the quantitation limit to be considered detectable.

Table 9-8

Summary of Laboratory Quality Control Procedures[a] by Analytical Method

Parameter	EPA SW-846[b] Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
Target compound volatile organics	8240B or 8260A	Instrument performance: mass calibration/ion abundance pattern	Every 12 hours of analysis time	Per method	Repeat until acceptance criteria satisfied
		Initial calibration: instrument sensitivity and linearity of response	Five concentration levels; after each instrument performance, check prior to sample analysis	Relative response factors (RRF) within method limits	Repeat calibration
		Continuing calibration	Every 12 hours of analysis time	Average RRFs <25% difference	Repeat calibration
		Internal standards	All calibration standards, samples, and blanks	Extracted ion current profile (EICP); D -50 to +100% Retention time shifts <0.50 minutes	Correct malfunction; reanalyze sample per method criteria
		Method blank	Every 12 hours of analysis time	<5 times quantitation limit for methylene chloride, acetone, 2-butanone; all other compounds < or = to quantitation limit	Determine source of contamination, and document corrective action; reextract and reanalyze samples
		System monitoring compounds	Every method blank, sample, matrix spike, matrix spike duplicate; matrix specific, per method limits	Check instrument and calculations; reanalyze per method criteria	
Target compound semivolatile organics	8270B or 8250A	Instrument performance: mass calibration/ion abundance pattern	Every 12 hours	Per method	Repeat until acceptance criteria satisfied

Refer to footnotes at end of table.

Table 9-8 (Continued)

Summary of Laboratory Quality Control Procedures[a] by Analytical Method

Parameter	EPA SW-846[b] Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
		Initial calibration: instrument sensitivity and linearity of response	Five concentration levels. After each performance, check prior to sample analysis	RRFs within method limits	Repeat calibration
		Continuing calibration	Every 12 hours	Average RRFs <25% difference	Repeat calibration
		Internal standards	All calibration standards, samples and blanks	EICP D -50 to +100% Retention time shifts <0.50 minutes	Correct malfunction; reanalyze sample per method criteria
		Method blank	Each group of samples of similar matrix and concentration level (soils)	<5 times quantitation limit for phthalate esters; all other compounds < or = to quantitation limit	Determine source of contamination; document corrective action; reextract and reanalyze samples
		Surrogate compounds	Each sample, blank	Matrix-specific per method limits	Reextract and reanalyze per method criteria
Organo-chlorine pesticides	8080A	Gas chromatograph column resolution	Prior to each initial calibration, or each column and instrument	Per method criteria	Change column, detector, clean system, etc.; repeat procedure

Refer to footnotes at end of table.

Table 9-8 (Continued)

Summary of Laboratory Quality Control Procedures[a] by Analytical Method

Parameter	EPA SW-846[b] Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
Organo-chlorine pesticides (cont'd)	8080A	Initial calibration	Three concentration levels calibration sequence prior to sample analysis after resolution check	Calibration factors and retention times must meet method criteria	Repeat calibration
		Continuing calibration	Every 12 hours	Calibration factors and retention times must meet method criteria	Repeat calibration
		Method blank	One per field batch, every 20 samples, every 14 days, or whenever similar extraction method used; whichever more frequent	All analytes less than quantitation limits, retention times within windows	Reextract and reanalyze all associated samples
		Instrument blank	First analysis every 12 hours following calibration	Less than 0.5 times quantitation limits, retention times within windows; surrogates acceptable	Correct malfunction; repeat calibration sequence, re-analyze blank, re-inject all associated samples
		Sulfur clean-up blank	Each sample set requiring sulfur clean-up	All analytes less than quantitation limits; surrogate retention times within windows	Reextract and reanalyze all associated samples

Refer to footnotes at end of table.

Table 9-8 (Continued)

Summary of Laboratory Quality Control Procedures[a] by Analytical Method

Parameter	EPA SW-846[b] Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
Metals	6010A	Surrogate compounds Instrument calibration Initial/continuing calibration	Each sample and blank Daily, or each setup After instrument calibration, 10% or every 2 hour	60 - 150% recovery 5% of true value 10% of true value	Advisory only--no action Repeat calibration Correct problem, recalibrate and reanalyze previous ten samples
		Initial/continuing calibration blank	Every calibration, 10% or 2 hours	< contract-required detection limits	Correct problem; recalibrate and reanalyze all samples since last blank
		Preparation blank	Each batch of digested samples	< contract-required detection limits	Redigest and reanalyze all associated samples per method criteria
		Interference check sample (ICS)	Each run or twice per 8-hour shift	20% of true value	Correct problem; recalibrate, reanalyze all samples since last ICS
		Duplicate sample analysis	Once per field batch per matrix	0 - 20% relative percent difference when < five times detection limit; detection limit otherwise	Flag data
		Laboratory control sample (LCS)	Once per field batch or each digest group	80 - 120% recovery (except silver, antimony)	Correct problem; redigest and reanalyze all samples since last LCS

Refer to footnotes at end of table.

Table 9-8 (Continued)

Summary of Laboratory Quality Control Procedures by Analytical Method

Parameter	EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
Metals (con't)	6010A	Serial dilution analysis	Once per field batch per matrix	10% original determination	Flag data
		Instrument detection limit	Quarterly	As determined	Not applicable
		Inter-element corrections	Annually	As determined	Not applicable
		Linear range analysis	Quarterly	5% of true value	Reanalyze

[a] Source: U.S. Environmental Protection Agency, 1990, "U.S. Environmental Protection Agency Contract Laboratory Program Statement of Work for Inorganic and Organic Analysis." Not all listed procedures may be applicable to SW-846 protocols.

[b] U.S. Environmental Protection Agency, 1992, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.

10.0 CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS

This section describes selected solid waste management units (SWMU) that have been identified at Technical Area (TA) 16 at Los Alamos National Laboratory (LANL). Because TA-16 encompasses a relatively large area and contains a large number of SWMUs, this section will address only those SWMUs that may reasonably be expected to potentially impact the units included in this permit application. Information on the remaining SWMUs at TA-16 is contained in Revision 1.0 of LANL's "Solid Waste Management Units Report" (LANL, 1990), hereafter referred to as the 1990 SWMU Report, and in the "RFI Work Plan for Operable Unit 1082," (LANL, 1993a). Attachment 10-1 contains SWMU characterization sheets in response to regulatory requirements in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart IX, 270.14(d). The characterization sheets were taken from 1990 SWMU Report.

LANL uses the definition of a SWMU presented in "Module VIII: Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments to RCRA for Los Alamos National Laboratory, EPA I.D. NM0890010515" (U.S. Environmental Protection Agency [EPA], 1994a), referred to as Module VIII. This definition states that SWMUs are "any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at or around a facility at which solid wastes have been routinely and systematically released."

10.1 SWMU DESCRIPTIONS

Several types of SWMUs are present at TA-16. These SWMUs include those identified for corrective actions in Module VIII, as modified following a Class III permit modification effective May 19, 1994; SWMUs that are active Resource Conservation and Recovery Act (RCRA) units; and SWMUs identified in the 1990 SWMU Report. Descriptions of the SWMUs are presented in the following sections. These descriptions were compiled from the "RFI Work Plan for Operable Unit 1082" and from the 1990 SWMU Report. Figures 10-1 and 10-2 show the locations of the selected SWMUs in the vicinity of the TA-16-88 container storage area and in the vicinity of the TA-16 burning ground, respectively.

10.1.1 Open Burn/Open Flash Units

TA-16-386 is an inactive flash pad at the TA-16 burning ground. The unit, identified as SWMU No. 16-010(a) in Module VIII, was built in 1951 and measures 100 feet (ft) long by 100 ft wide. It was formerly used to burn high-explosives (HE)-contaminated equipment and waste HE but is currently used as a storage area (LANL, 1990; LANL, 1993a).

TA-16-387 is an flash pad that was constructed in 1951. It is an active RCRA unit for which a permit is being sought through this permit application. The pad/burn area consists of a layer of sand several inches thick in a 100- by 100-ft fenced area. The pad is used for flash burning HE-contaminated material under RCRA interim status requirements. The unit is identified as SWMU No. 16-010(b) in Module VIII.

TA-16-388 and TA-16-399 are former burn pads that were converted to burn tables. These active units are used to burn HE scrap under RCRA interim status requirements; they are two of the units for which a permit is being sought through this permit application. Currently, these 100 foot (ft) long by 100 ft wide enclosed areas each consist of a concrete pad, used for unloading explosives, and a burn table. Each burn table is 2 ft above the ground and holds a tray that is 16 ft long by 4 ft wide. HE is placed on the tray and burned. Each table has a metal-covered rain guard that can be rolled back to expose the tray. TA-16-388 and TA-16-399 are identified as SWMU Nos. 16-010(c) and 16-010(d), respectively, in Module VIII.

TA-16-392 is a former filter bed that was constructed in 1951. The unit was converted to a burn pad in 1988 for the purpose of burning suspected uranium-contaminated objects (LANL, 1993a). The unit is identified as SWMU No. 16-010(i) in Module VIII.

10.1.2 Filter Beds/Filter Vessels

The former location of a filter bed (TA-16-393) is identified as SWMU No. 16-005(g) in Module VIII. The unit received HE-residue wash water from the basket wash facility (see Section 10.1.6) and drained the filtered wash water to an adjacent area. TA-16-393 was decommissioned and removed in 1965.

TA-16-394 is a filter bed that was built in 1951 to receive HE-residue wash water from the basket wash facility. A pipe drained the filtered wash water to the adjacent area southeast of the bed. The filter bed has been modified and now consists of a 12 ft long by 12 ft wide by 1 ft deep metal tray filled with 6 to 8 inches of sand. This burn tray contains two elevated shallow steel pans. Oil and solvents contaminated with HE are poured into the trays and burned. This burn tray is an active RCRA unit for which a permit is being sought through this permit application. It currently operates under RCRA interim status requirements and is identified as SWMU No. 16-010(j) in Module VIII.

TA-16-401 and TA-16-406 are steel filter vessels at the TA-16 burn ground. These active units operate under RCRA interim status requirements and are designated as SWMU Nos. 16-010(e)

and 16-010(f), respectively, in Module VIII. They are two of the units for which a permit is being sought through this permit application. SWMU No. 16-010(e) was built in 1961 to filter HE-contaminated wash water from the basket wash facility, TA-16-390. Wash water was carried from the basket wash facility to the filter vessel through a trough (TA-16-1129). This arrangement was used until 1966, when TA-16-390 was decommissioned. SWMU No. 16-010(f) replaced filter bed TA-16-393, which was taken to TA-54 for disposal in 1965.

The filter vessels are made of steel and measure 8 ft in diameter and 10 ft high. They are equipped with jib-crane-operated, cone-shaped steel covers. Approximately 3 ft of the filter vessels are above grade. The structures are cone-shaped steel containers with a surface layer of sand overlying layers of fine and coarse gravel.

The filter vessels are now used for filtering HE/water sludge from HE sumps. The sludge, which is brought in on tank trucks from HE sumps site wide, is pumped into a filter vessel and dried by blowing hot air across the filtered residue. The residue is burned in the vessel and any residual material is raked out and put into drums for reburning.

A drainage system takes the filtered water from the filter vessel to a filter/treatment unit (TA-16-363).

10.1.3 Storage Areas

A container storage area is located at TA-16-88. This active unit currently operates under RCRA interim status requirements, and is one of the units for which a permit is being sought through this permit application. It is identified as SWMU No. 16-012(a2) in the 1990 SWMU Report. Wastes stored in this container storage area include solid hazardous and low-level mixed waste.

A storage area was formerly located near or within TA-16-386. Barium nitrate was reportedly placed in the area in the 1940s and remained there until it was removed in the late 1960s (LANL, 1990; LANL, 1993a). This area is identified as SWMU No. 16-016(c) in Module VIII.

10.1.4 Contaminated Soils

Potential soil contamination associated with the operation and/or decommissioning of HE magazines and HE machining buildings comprises several SWMUs in TA-16. Potentially HE-contaminated surface soil at two HE magazines (TA-16-74 and TA-16-30) comprise SWMU Nos. 16-024(b) and 16-024(c), respectively. The HE magazines, identified in the 1990 SWMU

Report, were small wooden structures with concrete floors that were used to temporarily store HE during processing operations. Both units were removed in 1960.

HE-contaminated soil is potentially present as a result of operations at TA-16-35 and is designated as SWMU No. 16-025(c) in the 1990 SWMU Report. TA-16-35 was a 15- by 13- by 8-foot utility building that supported HE-machining operations in TA-16-31, TA-16-32, and TA-16-33. The building was removed sometime after May 1960.

Surface and subsurface soil contamination also potentially exists at the sites of three former buildings (TA-16-33, TA-16-31, and TA-16-32) that were removed between 1960 and 1961. The areas are identified as SWMU Nos. 16-024(e), 16-025(e), and 16-025(f), respectively, in the 1990 SWMU Report. The buildings, which were similar in structure to the HE magazine described above, were used for machining and processing HE.

10.1.5 Septic Tank

TA-16-385 is a septic tank that serves a water closet, a lavatory, and a floor drain at the TA-16 burning grounds. The unit, which was constructed in 1963, is made of steel and has a 385-gallon capacity. Wastes managed at this unit include domestic and industrial sewage. In addition, sampling of TA-16-385 in 1988 revealed the presence of volatile organic compounds (LANL, 1990). The unit is identified as SWMU No. 16-006(e) in Module VIII.

10.1.6 Basket Wash Facility and Associated Structures

A basket wash facility (TA-16-390) was formerly located at TA-16. The building was constructed in 1951 and was used to wash HE-contaminated basket filters collected from sumps. Wash water from the operation was carried to filtering vessels via one of four transfer troughs (see below). Operations at the facility ceased in 1966 and the facility has since been decommissioned (LANL, 1990; LANL, 1993a). The unit is designated as SWMU No. 16-010(h) in Module VIII.

TA-16-1129, -1134, -1135, and -1136 are all inactive troughs that formerly carried HE-contaminated or potentially HE-contaminated wash water from the basket wash facility to one of four filtering vessels. The units are identified as SWMU Nos. 16-010(k), 16-010(l), 16-010(m), and 16-010(n), respectively, in Module VIII. Each of the units is a steel, V-shaped trough that is open on the top. The units are supported by a steel frame and elevated approximately 3 ft off the ground. In addition to transporting HE-contaminated or potentially HE-contaminated wash water, SWMU No. 16-010(n) also transported wash water potentially contaminated with uranium (LANL, 1993a). SWMU No. 16-010(n) was dismantled in 1988 (LANL, 1993a).

10.1.7 Surface Impoundment

SWMU No. 16-008(b) is an inactive surface impoundment at the TA-16 burning grounds. In operation from around the 1940s until the 1980s, the unit measured 60 ft long, 35 ft wide, and 4 ft deep and received liquid from two filter vessels (TA-16-401 and TA-16-406). The sludge in the surface impoundment contained HE residue, barium sulfate, and barium nitrate (LANL, 1990). The unit underwent closure in 1990.

10.1.8 Disposal Area

Material Disposal Area P (MDA-P) is an inactive, 6.71-acre disposal area located near the south rim of Cañon de Valle and to the north of TA-16-387 (LANL, 1993a). Waste disposal at MDA-P began in the early 1950s and continued until 1984. Items disposed of at MDA-P included wastes from the synthesis, processing, and testing of HE; photo development process wastes; residues from burning HE-contaminated equipment and debris; debris generated during demolition of S-Site; and barium-contaminated sands generated by burning HE (LANL, 1993a). Prior to being used as a waste disposal site, the area was used to burn HE detonators. MDA-P is identified as SWMU No. 16-018 in Module VIII.

10.1.9 Filter/Treatment Unit

TA-16-363 (formerly TA-16-228) is a carbon filter/treatment unit. Constructed in 1988, this unit is used treat wastewater generated by two filter vessels (TA-16-401 and TA-16-406). Treated effluent from the carbon filter/treatment unit is discharged through a National Pollutant Discharge Elimination System (NPDES)-permitted outfall. The unit is designated as SWMU No. 16-010(g) in Module VIII.

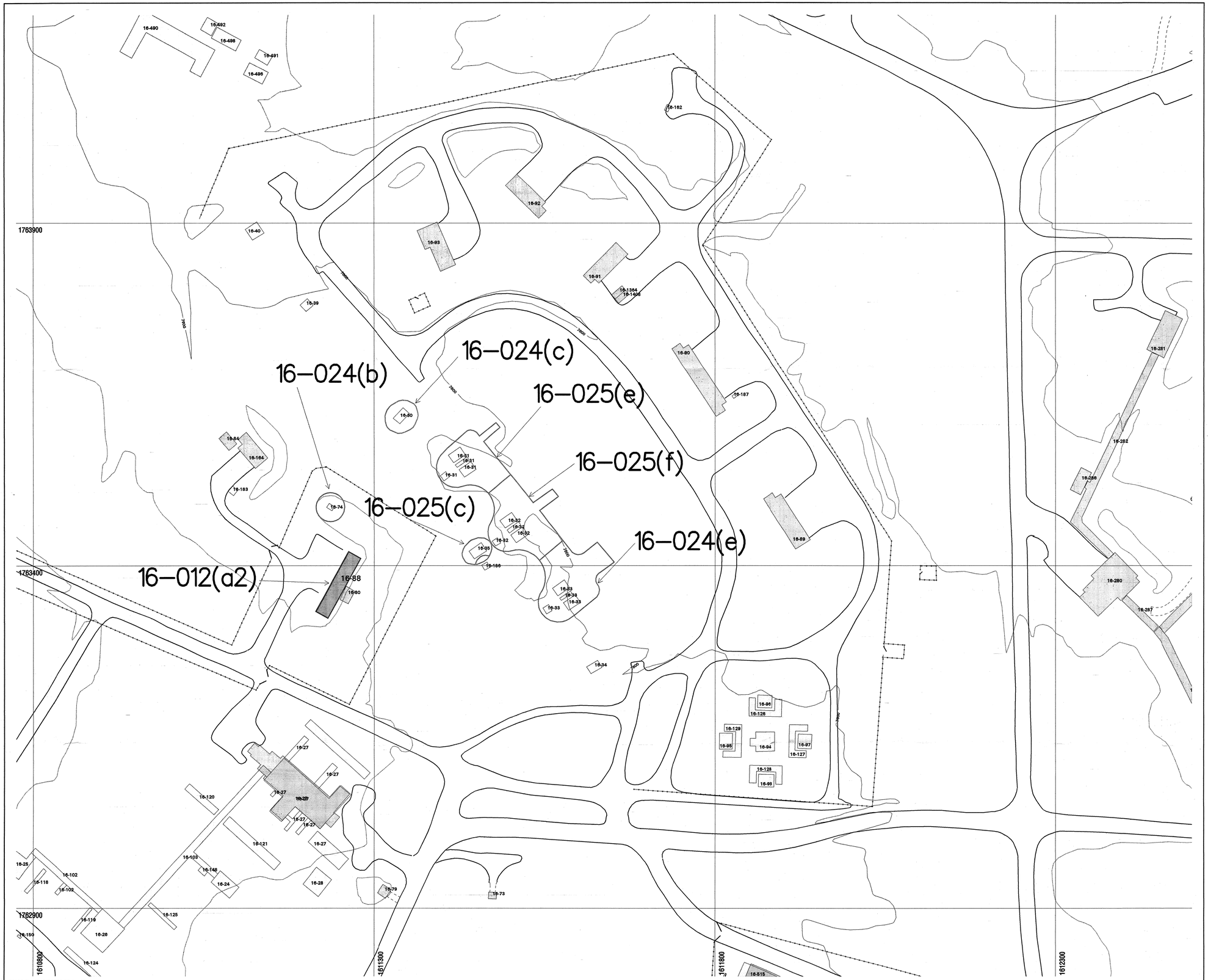
10.1.10 Drainage System/Outfall

SWMU No. 16-028(a) was originally described in the 1990 SWMU Report as both a drainage system associated with TA-16-363 (formerly TA-16-228) and as an outfall associated with the filter/treatment unit described in Section 10.1.9. More recent information, however, suggests that the latter description of this SWMU is inaccurate and that the outfall is actually a duplicate of SWMU No. 16-010(g) (LANL, 1993a). The drainage system discharges to the canyon between TA-16-363 and the inactive surface impoundment described in Section 10.1.7. Discharged material may include HE, and in the past may have included barium (LANL, 1990).

10.2 RELEASES

Some large debris items from MDA-P [SWMU No. 16-018] are known to have fallen into Cañon de Valle (LANL, 1993a). Soil samples collected from MDA-P during a U.S. Department of

Figure 10-1: Solid Waste Management Units (SWMU) in the Vicinity of Building 88 at Technical Area (TA) 16

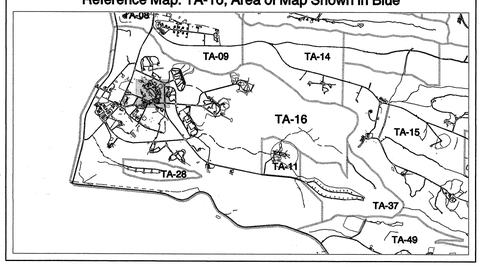


FIMAD Plot ID: G103529 22 Jun 95

Boundary, TA
Contours, 10 foot
Contours, 100 foot
Fence, Industrial
Fence, Security
SWMU Boundary
Roads, Dirt
Roads, Paved
Road/Trail
Former Structure
Permanent Structure
Temporary Structure
Structure TA-16-88

5973-H

Reference Map: TA-16, Area of Map Shown in Blue



N

State Plane Coordinate System, New Mexico Central Zone.
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 500
Feet per inch on map = 70

SCALE 1:840

FEET: 0, 21, 42, 63, 84

METERS: 0, 70, 140, 210, 280

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Other boundary, structure, and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data are from Los Alamos National Laboratory Environmental Restoration Project aerial survey, September 1991.

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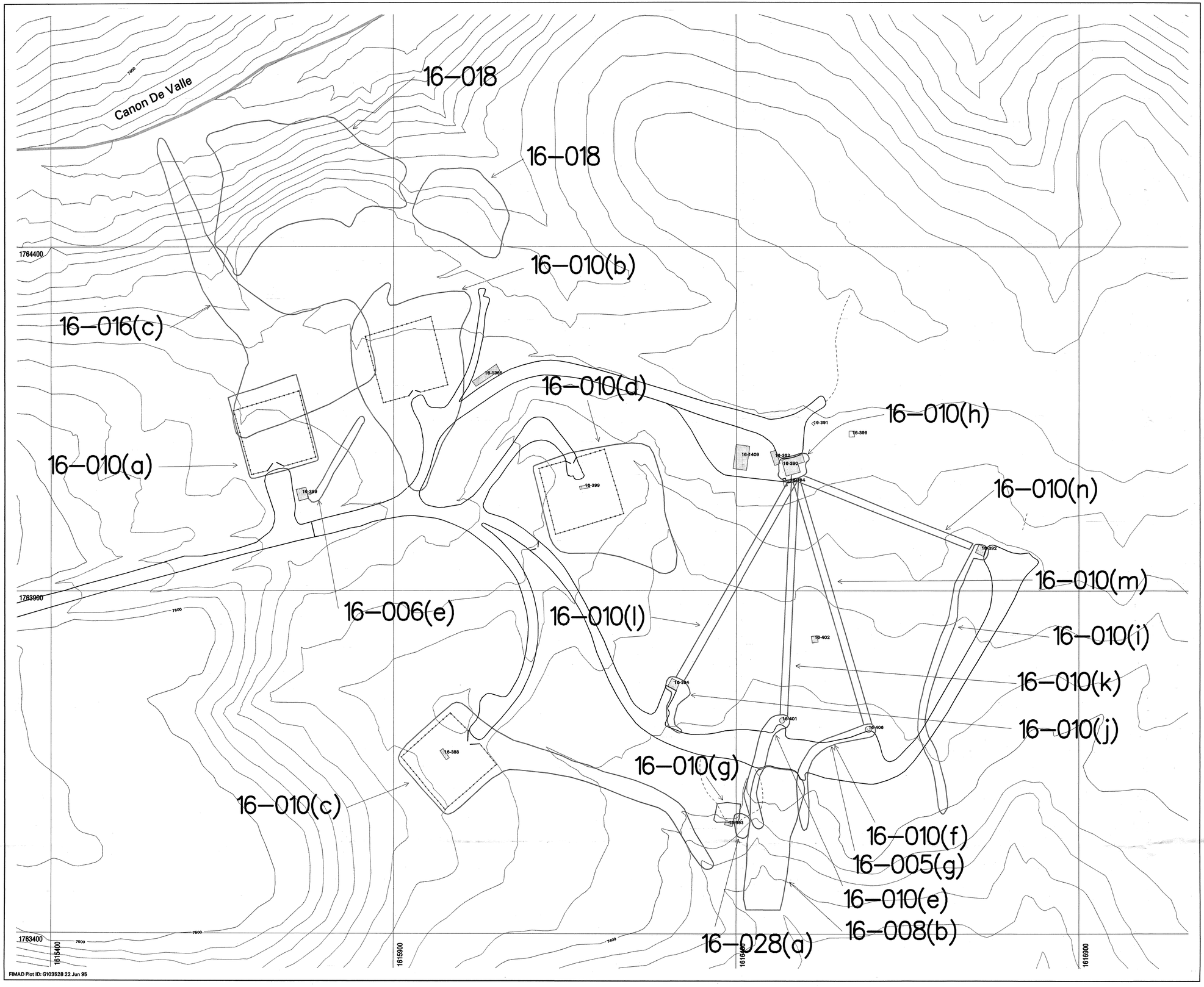
Produced by: Doug Walther

Date: June 22, 1995 FIMAD Plot ID: G103529

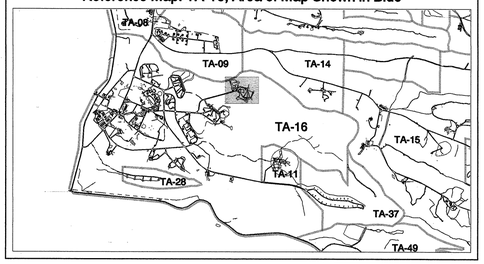
Figure 10-2: Solid Waste Management Units (SWMU) in the Vicinity of Burning Ground at Technical Area (TA) 16



FIMAD Plot ID: G103528 22 Jun 95

5973-I

Reference Map: TA-16, Area of Map Shown in Blue



N

State Plane Coordinate System, New Mexico Central Zone.
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 500
Feet per inch on map = 70

SCALE 1:840

0 21 42 63 84

METERS

0 70 140 210 280

FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Other boundary, structure, and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data are from Los Alamos National Laboratory Environmental Restoration Project aerial survey, September 1991.

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Produced by: Doug Walther

Date: June 22, 1995 FIMAD Plot ID: G103528

Energy Environmental Survey contained barium in concentrations exceeding the EPA's extraction procedure toxicity threshold (LANL, 1990). The extent of contamination in the canyon, if any, is unknown. SWMU No. 16-018 has been identified for deferred action in the "RFI Work Plan for Operable Unit 1082" (LANL, 1993a). However, samples will be collected prior to implementing process modifications (as outlined in Section 4.0) to identify baseline contamination. In addition, sampling and analytical data will be collected upon closure.

10.2.1 Corrective Actions

Pursuant to 20 NMAC 4.1, Subpart V, 264.101(a), corrective actions are required only for releases of hazardous waste or hazardous constituents. There have been no documented releases of RCRA hazardous waste or hazardous constituents from the TA-16 SWMUs previously described. However, because the SWMUs are located in areas where waste has been historically and is currently managed they will be investigated and remediated, as necessary, with EPA's and the New Mexico Environment Department's approval. Any corrective action needed at TA-16, will follow the RCRA Facility Investigation/Corrective Measures Study process. Activities conducted would include surface and subsurface sampling.

ATTACHMENT 10-1

Solid Waste Management Unit Characterization Sheets
(From: Solid Waste Management Units Report, LAUR 90-3400, LANL, 1990)

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : SEPTIC SYSTEM
UNIT USE : TREATMENT/DISPOSAL
OPERATIONAL STATUS : DECOMMISSIONED
PERIOD OF USE : SEE BELOW
HAZARDOUS RELEASE : UNKNOWN
RADIOACTIVE RELEASE : NONE

MATERIALS MANAGED : SANITARY WASTE
HAZARDOUS WASTE

UNIT INFORMATION

SWMU NO.	STRUCTURE	STRUCTURE TYPE	BUILT	REMOVED	CAPACITY/DIMENSIONS	BUILDINGS SERVED	OUTFALL LOCATION
16-005(a)	TA-16-161	septic tank	1945		11'6" x 13'6" x 9'7"	TA-16-42 thru -45	Water Canyon
16-005(b)	TA-16-174	septic tank	1945		4' x 8' x 4'6"	TA-16-502	Valle Canyon
16-005(c)	TA-16-176	septic tank	1945		8' x 6' x 4'		Water Canyon
16-005(d)	TA-16-177	septic tank	1945	1968	10' x 6' x 4'6"	TA-16-141	Valle Canyon
16-005(e)	TA-16-179	septic tank	1948			TA-16-37	Water Canyon
16-005(f)	TA-16-272	septic tank	1951		1500 gallons	TA-16-260	Valle Canyon
16-005(g)	TA-16-393	filter bed		1965			Valle Canyon
16-005(h)	TA-16-431	septic tank	1952	1968		TA-16-430	Water Canyon
16-005(i)	TA-16-486	septic tank	1951	1951	7' x 4' x 4'		unknown
16-005(j)	TA-16-504	septic tank	1948	1963	4' x 5' x 3'		Valle Canyon
16-005(k)	TA-16-1132	septic tank		1956			unknown
16-005(l)	TA-16-1137	grease trap					Water Canyon
16-005(m)	TA-16-507	chemical pit	1944	1960	8'6" x 4'6" x 5		
16-005(n)	TA-16-173	septic tank	1949	1971	600 gallons		
16-005(o)	TA-16-420		1952	1962	unknown		

Septic tank TA-16-260 was associated with dosing chamber TA-16-273 and distribution box TA-16-274. Septic tank TA-16-431 was associated with manholes TA-16-764 and -763. Tanks TA-16-161, -174, -176, -177 were constructed of reinforced concrete. Construction details on the other tanks is lacking. In addition to these systems, engineering drawings indicate several unmarked tanks that were also decommissioned including an unmarked tank south of TA-16-515. It is unknown whether septic tanks TA-16-174 and TA-16-504 have been removed. Outfalls were associated with tanks TA-16-272, -177, -431, -1132, -174, -179, and -1137.

WASTE INFORMATION

The waste consisted of domestic and, for some systems, industrial sewage. It is possible that TA-16-272 received TNT, HMX, RDX, boron, and barium. Tank TA-16-504 received solvents and possibly photographic solutions. Tank TA-16-431 may have received solvents and HE.

RELEASE INFORMATION

Information on possible residuals in the associated drain fields and outfall areas is lacking.

NOTES

SWMU No. 16-005(m) has been renumbered to 16-029(h2) because it is part of an inactive HE sump system. SWMU Nos. 16-005(g) and (h) are the dosing chamber and distribution box for the TA-16-272 septic system; all three are considered one system and are addressed as 16-005(f).

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-005(a)	TA16-1-CA-I-HW		Tsk 14 : 460	TA-16-161
16-005(b)	TA16-1-CA-I-HW		Tsk 14 : 458 399	TA-16-174
16-005(c)	TA16-1-CA-I-HW		Tsk 14 : 461	TA-16-176
16-005(d)	TA16-1-CA-I-HW		Tsk 13 : 238 246	TA-16-177
16-005(e)	TA16-1-CA-I-HW		Tsk 14 : 462	TA-16-179

(continued)

SWMU CROSS-REFERENCE LIST
(continued)

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-005(f)	TA16-1-CA-I-HW		Tsk 12 : 80 104	TA-16-272
16-005(g)	TA16-1-CA-I-HW		Tsk 12 : 178-180	TA-16-393
16-005(h)	**		Tsk 14 : 463 451	TA-16-431
16-005(i)	TA16-1-CA-I-HW		Tsk 12 : 105 106	TA-16-486
16-005(j)	TA16-1-CA-I-HW TA24-2-S/UST-I-HW/RW		Tsk 13 : 376 377	TA-16-504
16-005(k)	TA16-1-CA-I-HW		Tsk 14 : 411 464	TA-16-1132
16-005(l)	TA16-1-CA-I-HW		Tsk 14 : 407 468	TA-16-1137
16-005(m)	TA24-2-S/UST-I-HW/RW TA16-2-S-A/I-HW TA16-1-CA-I-HW		Tsk 13 : 389	TA-16-507
16-005(n)	**	16.030	Tsk 13 : 245	TA-16-173
16-005(o)	**		Tsk 14 : 452 465	TA-16-420

** No corresponding E. R. Program unit.

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : SEPTIC SYSTEM
UNIT USE : TREATMENT/DISPOSAL
OPERATIONAL STATUS : ACTIVE/INACTIVE
PERIOD OF USE : SEE BELOW
HAZARDOUS RELEASE : UNKNOWN
RADIOACTIVE RELEASE : NONE

MATERIALS MANAGED : SANITARY WASTE
SUSPECTED HAZARDOUS WASTE

UNIT INFORMATION

The following are active and inactive septic systems in TA-16:

SWMU NO.	STRUCTURE	CONSTRUCTED	STATUS	CAPACITY	DIMENSIONS/CONSTRUCTION	EID NO.
16-006(a)	TA-16-175	1946	active	500 gal	10' x 6' x 4'6"/reinforced concrete	LA-38
16-006(b)	TA-16-178	1952	active	380 gal		LA-39
16-006(c)	TA-16-371	1953	active	1,216 gal		LA-24
16-006(d)	TA-16-381	1952	active	540 gal		LA-25
16-006(e)	TA-16-385	1963	active	385 gal	steel	LA-26
16-006(f)	TA-16-1153	1987	active	1,000 gal		
16-006(g)	TA-16-527	1944	inactive	1,500 gal	10' x 6' x 4'6"	
16-006(h)	TA-16-526	1945	unknown	unknown	6' x 6' x 6'6"	
16-006(i)	TA-16-00	?	active	1,000 gal		

Of the active septic systems, TA-16-178, -371, and -381 overflow to leach fields and TA-16-175 and -385 overflow to drain lines. The active systems appear to be operating properly. The Environmental Restoration Release Site Database indicates that a septic system and drainage system may have served TA-16-24 and -490. It also indicates that the capacity of TA-16-381 is 450 gallons. TA-16-00 serves Building 370 and overflows to a seepage bed.

WASTE INFORMATION

The waste consists of domestic sewage and industrial waste. In November 1988, TA-16-175 and -385 were sampled. The results of the analyses indicated that volatiles were present and EP Toxic metals were below detection limits. Tank TA-16-527 may have handled liquids containing HE residues. There is no information on TA-16-526.

RELEASE INFORMATION

It is unknown whether any of these septic systems have caused a hazardous waste release. Outfalls are asociated with tanks TA-16-175, -178, -385, and -371.

NOTES

SWMU Nos. 16-006(a) and (g) are decommissioned and are now addressed as SWMU Nos. 16-005(n) and (o), respectively.

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-006(a)	TA16-8-ST/UST-A/I-HW/RW	? 16.030	Tsk 14 : 400 459	TA-16-175
16-006(b)	**	? 16.030	Tsk 14 : 398 457	TA-16-178
16-006(c)	TA16-8-ST/UST-A/I-HW/RW	? 16.030	Tsk 12 : 98 108	TA-16-371
16-006(d)	TA16-8-ST/UST-A/I-HW/RW	? 16.030	Tsk 12 : 111 110	TA-16-381
16-006(e)	**		Tsk 12 : 89 107	TA-16-385
16-006(f)	**		Tsk 12 : 99 109	TA-16-1153
16-006(g)	TA16-8-ST/UST-A/I-HW/RW	? 16.030	Tsk 13 : 392	TA-16-527
16-006(h)	TA25-2-CA/ST-I-HW	? 16.030	Tsk 13 : 396	TA-16-526
16-006(i)	**			TA-16-00
16-006(misc)	**	16.062	Tsk 13 : 374 375	

? Indicates uncertainty with RFA Unit correlation.
** No corresponding E. R. Program unit.

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : SURFACE IMPOUNDMENT
UNIT USE : STORAGE/DISPOSAL/TREATMENT
OPERATIONAL STATUS : INACTIVE
PERIOD OF USE : EST. 1940s - 1980s
HAZARDOUS RELEASE : UNKNOWN
RADIOACTIVE RELEASE : NONE

MATERIALS MANAGED : HAZARDOUS WASTE
RADIOACTIVE WASTE
MIXED WASTE

UNIT INFORMATION

An inactive, unlined pond [16-008(a)] received liquid waste from process buildings TA-16-89, -90, -91. The pond was approximately 100' x 250'. Remains of the pond were documented in the RFA. There was a hypalon-lined pond [16-008(b)] at the TA-16 burning ground. According to the RFA, the pond was 60' x 35' x 4'. The pond received liquid from two filtration beds to the south of the pond. To reduce the barium nitrate level in the pond, liquid sodium sulfate was added on one occasion to precipitate barium as barium sulfate. When barium nitrate levels had been reduced to less than 100 ppm, the liquid was discharged to an outfall. A closure plan has been approved by the state and closure will be completed in June, 1990 in accordance with the approved plan.

WASTE INFORMATION

The waste in the unlined pond may have consisted of HE, including barium and chemicals used in electroplating operations. Samples of the unlined pond sludge did not contain high levels of HE. The sludge in the lined pond contained barium sulfate, barium nitrate, and HE residue.

RELEASE INFORMATION

There is no evidence of hazardous releases from the inactive process building pond. Sampling indicates that there has been no release below the liner. The lined pond discharged to an outfall. The receiving canyon below the outfall was sampled for barium on February 11, 1987. Analytical results indicate barium concentrations in the soil of 26 mg/l at 3 feet below the outfall, 6.6 mg/l at 10 feet below the outfall, and 2.7 mg/l at 40 feet below the outfall. The background for barium in soil near the outfall is 0.8 mg/l. As part of Environmental Problem #24 of the DOE Environmental Survey, three soil samples were collected from the unlined drainage pond below the TA-16-93 plating shop. Gamma screens indicated the presence of Cs-137 and natural activities in all three samples.

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-008(a)	TA16-3-SI-A/I-HW	16.005	Tsk 13 : 247 252	TA-16-89, -90, -91
16-008(b)	TA16-3-SI-A/I-HW	16.019	Tsk 12 : 120	TA-16-392

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : OPEN BURNING
UNIT USE : TREATMENT/DISPOSAL
OPERATIONAL STATUS : ACTIVE/INACTIVE
PERIOD OF USE : 1940s - PRESENT
HAZARDOUS RELEASE : KNOWN
RADIOACTIVE RELEASE : UNKNOWN

MATERIALS MANAGED : HAZARDOUS WASTE
RADIOACTIVE WASTE

UNIT INFORMATION

TA-16 appears to have had a HE burning ground at the present location since the beginning of operations in the technical area. A 1948 topographic map shows what appears to be a burning ground with two burn pads located at the present burn site. Equipment contaminated with HE and waste HE are burned at this area. The following table includes many of the structures associated with this burning ground:

SWMU NO.	STRUCTURE	TYPE	BUILT	DIMENSIONS	CURRENT USE
16-010(a)	TA-16-386	burning area	1951	100' x 100'	storage area
16-010(b)	TA-16-387	burning area	1951	100' x 100'	flash pad
16-010(c)	TA-16-388	burning slab	1951	12' x 20'	burn table (4' x 16')
16-010(d)	TA-16-399	burning slab	1951	20' x 20'	burn table (4' x 16')
16-010(e)	TA-16-401	pressure filter tank	1961	8' dia x 10' high, steel	same
16-010(f)	TA-16-406	pressure filter tank	1965	8' dia x 10' high, steel	same
16-010(g)	TA-16-228	filter/treatment unit	1988		wastewater treatment
16-010(h)	TA-16-390	basket wash facility	1951		equipment storage
16-010(i)	TA-16-392	filter bed	1951		burning pad (inactive)
16-010(j)	TA-16-394	filter bed	1951	12' x 12' x 1'	open burning tray
16-010(k)	TA-16-1129	trough	1951		inactive
16-010(l)	TA-16-1134	trough	1951		inactive
16-010(m)	TA-16-1135	trough	1951		inactive
16-010(n)	TA-16-1136	trough			inactive

Several processes for HE treatment and disposal are conducted at the burning grounds: 1) Equipment contaminated with HE is flashed at the flash pad, TA-16-387. The pad consists of a layer of sand several inches thick over a soil surface. In the past, the items that required disposal by flashing were disposed of at MDA-P. 2) Waste HE is disposed of at burn tables, TA-16-388 and -399. These tables, which were constructed near former burning slabs, are about 2' above the ground and hold burn trays that are about 4' x 16' in size. 3) HE sludge is processed through pressure filter tanks TA-16-401 and -406. These tanks are cone shaped steel containers with a surface layer of sand overlying layers of fine and coarse gravel. The sludge is dried and then burned in the tanks. Approximately 750 pounds of sludge can be burned at one time. Recently (1988) a carbon filter treatment unit, TA-16-228, was installed to treat wastewater draining from the tanks. 4) Oil contaminated with solvents is burned at TA-16-394. This structure was modified from a filter bed and now consists of a 12' x 12' x 1' metal tray filled with 6 to 8 inches of sand. This tray contains four shallow steel pans that are lined with fire bricks onto which the contaminated oil is poured and ignited. The following disposal units were used in the past in the burning grounds, but are not currently active: 1) The basket washing facility, TA-16-390, was operated from 1951-1961. The HE residues in the washwater went into floor drains in this building to filter beds TA-16-392, -393, and -394 via troughs TA-16-1129, -1134, -1135, and -1136. After drying in the filter beds, the sludge was burned. About 400 pounds of HE could be burned in one day. The filter bed sand was raked after the initial burning and the raked material was taken to the scrap HE burning pit and reburned. Filter bed TA-16-393 was taken to TA-54 for disposal in 1965. 2) Uranium contaminated objects were also burned at this area at one time. Filter bed TA-16-392 was modified to a pad for this purpose.

WASTE INFORMATION

The waste consists of HE residues containing barium and a small amount of uranium that was used in some of the burns conducted in the past.

RELEASE INFORMATION

It is unknown the extent to which these areas may have caused a release of hazardous waste.

(continued)

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-010(a)	TA16-4-CA-A/I-HW/RW	16.015 16.009	Tsk 12 : 163	TA-16-386
16-010(b)	TA16-4-CA-A/I-HW/RW	16.032 16.008	Tsk 12 : 164	TA-16-387
16-010(c)	TA16-4-CA-A/I-HW/RW	16.016	Tsk 12 : 165 84	TA-16-388
16-010(d)	TA16-4-CA-A/I-HW/RW	16.033	Tsk 12 : 166	TA-16-399
16-010(e)	**	16.017 16.051	Tsk 12 : 187 87	TA-16-401
16-010(f)	**	16.018	Tsk 12 : 188	TA-16-406
16-010(g)	**		Tsk 12 : 182	TA-16-228
16-010(h)	TA16-4-CA-A/I-HW/RW	? 16.037	Tsk 12 : 176	TA-16-390
16-010(i)	TA16-4-CA-A/I-HW/RW	16.031	Tsk 12 : 177 85	TA-16-392
16-010(j)	TA16-4-CA-A/I-HW/RW	16.020 16.021 ? 16.032	Tsk 12 : 181 86 177	TA-16-394
16-010(k)	TA16-4-CA-A/I-HW/RW		Tsk 12 : 183	TA-16-1129
16-010(l)	TA16-4-CA-A/I-HW/RW		Tsk 12 : 184	TA-16-1134
16-010(m)	TA16-4-CA-A/I-HW/RW		Tsk 12 : 185	TA-16-1135
16-010(n)	TA16-4-CA-A/I-HW/RW		Tsk 12 : 186	TA-16-1136

? Indicates uncertainty with RFA Unit correlation.
** No corresponding E. R. Program unit.

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : CONTAINER STORAGE AREA
UNIT USE : STORAGE
OPERATIONAL STATUS : ACTIVE
PERIOD OF USE : ? - PRESENT
HAZARDOUS RELEASE : NONE
RADIOACTIVE RELEASE : NONE

MATERIALS MANAGED : HAZARDOUS WASTE

UNIT INFORMATION

The following table includes active container storage areas at TA-16.

STRUCTURE	SWMU NO.	TYPE OF STORAGE	STRUCTURE	SWMU NO.	TYPE OF STORAGE
TA-16-221	16-012(a)	rest house	TA-16-341	16-012(o)	rest house
TA-16-223	16-012(b)	rest house	TA-16-386	16-012(p)	<90 day
TA-16-225	16-012(c)	rest house	TA-16-343	16-012(q)	rest house
TA-16-260	16-012(d)	satellite	TA-16-345	16-012(r)	rest house
TA-16-261	16-012(e)	rest house	TA-16-360	16-012(s)	rest house
TA-16-263	16-012(f)	rest house	TA-16-370	16-012(t)	satellite
TA-16-281	16-012(g)	rest house	TA-16-430	16-012(u)	satellite
TA-16-285	16-012(h)	rest house	TA-16-435	16-012(v)	rest house
TA-16-300	16-012(i)	satellite	TA-16-437	16-012(w)	rest house
TA-16-302	16-012(j)	satellite	TA-16-460	16-012(x)	satellite
TA-16-303	16-012(k)	rest house	TA-16-463	16-012(y)	rest house
TA-16-304	16-012(l)	satellite	TA-16-283	16-012(z)	rest house
TA-16-306	16-012(m)	satellite	TA-16-88	16-012(a2)	<90 day
TA-16-340	16-012(n)	satellite			

A rest house is a transfer and temporary storage area for HE materials in between operations; most material in the rest houses is product.

WASTE INFORMATION

The containers, depending on the location, store spent solvents, HE-contaminated materials, scrap HE, barium nitrate, floor sweepings, and unknown wastes.

RELEASE INFORMATION

There have been no known releases from the active storage areas. However, past operations at most container storage areas have resulted in systematic releases of solid wastes, including RCRA-regulated constituents.

NOTES

SWMU No. 16-012(z) was formerly SWMU No. 16-013(b).

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-012(a)	**		Tsk 13 : 279	TA-16-221
16-012(a2)	**			TA-16-88
16-012(b)	**		Tsk 13 : 280	TA-16-223
16-012(c)	**		Tsk 13 : 281	TA-16-225
16-012(d)	**		Tsk 12 : 132	TA-16-260
16-012(e)	**		Tsk 13 : 268	TA-16-261
16-012(f)	**		Tsk 13 : 269	TA-16-263
16-012(g)	**		Tsk 13 : 272	TA-16-281
16-012(h)	**		Tsk 13 : 274	TA-16-285
16-012(i)	**	? 16.007	Tsk 13 : 278	TA-16-300

(continued)

SWMU CROSS-REFERENCE LIST
(continued)

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-012(j)	**		Tsk 13 : 270	TA-16-302
16-012(k)	**		Tsk 13 : 271	TA-16-303
16-012(l)	**		Tsk 13 : 286	TA-16-304
16-012(m)	**		Tsk 13 : 285	TA-16-306
16-012(n)	**		Tsk 12 : 126	TA-16-340
16-012(o)	**		Tsk 12 : 127	TA-16-341
16-012(p)	**	16.014		TA-16-386
16-012(q)	**		Tsk 12 : 129	TA-16-343
16-012(r)	**		Tsk 12 : 130	TA-16-345
16-012(s)	**		Tsk 12 : 125	TA-16-360
16-012(t)	**		Tsk 12 : 124	TA-16-370
16-012(u)	**		Tsk 14 : 562	TA-16-430
16-012(v)	**		Tsk 14 : 561	TA-16-435
16-012(w)	**		Tsk 14 : 563	TA-16-437
16-012(x)	**		Tsk 14 : 560	TA-16-460
16-012(y)	**		Tsk 14 : 559	TA-16-463
16-012(z)	**		Tsk 13 : 273	TA-16-283

? Indicates uncertainty with RFA Unit correlation.
** No corresponding E. R. Program unit.

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : LANDFILL
UNIT USE : DISPOSAL
OPERATIONAL STATUS : DECOMMISSIONED/INACTIVE
PERIOD OF USE : 1960s
HAZARDOUS RELEASE : UNKNOWN
RADIOACTIVE RELEASE : NONE

MATERIALS MANAGED : SOLID WASTE
SUSPECTED HAZARDOUS WASTE

UNIT INFORMATION

There are several landfills or surface disposal areas in TA-16. 1) In 1965, a magnetometer survey indicated an area where metal material had been buried [16-016(a)]. The material was located in the old exclusion area of TA-16. The area was excavated and the material was taken to MDA-P. It is possible that other buried material still exists in the area. 2) The 1987 CEARP field survey noted a surface disposal area consisting of broken concrete and debris with an illegible sign posted in front of the disposal area [16-016(b)]. The area is located in an area east of West Jemez Road and northwest of TA-16-540. 3) In the late 1940s, a possible landfill or storage area for barium nitrate may have been located at the site of the present TA-3-386 [16-016(c)]. The Environmental Restoration Release Site Database indicates that the barium nitrate stockpile is located near TA-16-386 on the edge of Del Valle Canyon, and rain has washed barium into the canyon. 4) A debris area is located near TA-16-222 [16-016(d)]. 5) A white, fibrous mass, ash, and firebrick are located southeast of TA-16-360 [16-016(e)]. 6) An area south of TA-16-360 contains construction debris [16-016(f)]. 7) Scattered debris is located in the canyon south of TA-16-370 [16-016(g)].

WASTE INFORMATION

The waste in the old exclusion area is metal. The CEARP field survey noted concrete and other debris possibly contaminated with HE in a surface disposal area. The possible landfill beneath the present TA-3-386 contains barium nitrate. The waste near TA-16-222 contains general trash, CMPs, and paint cans. The waste near TA-16-360 may contain asbestos. The debris south of TA-16-370 contains cans, pipes, and buckets. According to the Environmental Restoration Release Site Database, all of the surface disposals have the potential to be contaminated with HE.

RELEASE INFORMATION

It is unknown whether any of these areas have caused a release of hazardous waste.

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-016(a)	TA16-10-L-I-HW		Tsk 12 : 139	
16-016(b)	TA16-10-L-I-HW		Tsk 12 : 133	NEAR TA-16-540
16-016(c)	**		Tsk 12 : 138	TA-16-386, NEAR TA-16-389
16-016(d)	**		Tsk 12 : 134	NEAR TA-16-222
16-016(e)	**		Tsk 12 : 135	NEAR TA-16-360
16-016(f)	**		Tsk 12 : 136	NEAR TA-16-360
16-016(g)	**		Tsk 12 : 137	NEAR TA-16-370

** No corresponding E. R. Program unit.

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : LANDFILL
UNIT USE : DISPOSAL
OPERATIONAL STATUS : INACTIVE
PERIOD OF USE : LATE 1940s - 1985
HAZARDOUS RELEASE : KNOWN
RADIOACTIVE RELEASE : UNKNOWN

MATERIALS MANAGED : HAZARDOUS WASTE
SUSPECTED RADIOACTIVE WASTE

UNIT INFORMATION

MDA-P is a 6.71 acre landfill at the edge of Canon de Valle. Materials disposed in MDA-P are the noncombustible debris remaining from burned structures that were HE contaminated. A former detonator burning area is indicated as having been located within MDA-P. The debris consists of residuals of old magazines and explosives buildings from TA-6-9, -11, and -16. Other waste includes ashes from the incinerator, items suspected of being HE contaminated, chemical bottles and buckets, and general trash. Although a major portion of MDA-P has been covered with soil and leveled, some debris has fallen into the canyon bottom and the material on the edge of the filled area is still uncovered. A closure plan has been submitted to NMEID for MDA-P.

WASTE INFORMATION

The waste consists of HE-contaminated building debris containing barium, lead, and chemicals. The Environmental Restoration Release Site Database suggests that radioactive waste may also have been disposed.

RELEASE INFORMATION

Debris from MDA-P has fallen into the canyon. A culvert draining runoff water from a waste explosive burning pad was directed across the top of the site and caused erosion and subsidence in 1985. It is currently directed around the edge. The Environmental Restoration Release Site Database and DOE Environmental Survey indicate that soil samples collected from MDA-P contained EP toxic barium. The samples analysis was a a result of DOE Environmental Survey Environmental Problem #22.

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-018	MDA-P	16.028	Tsk 12 : 140 162	MDA-P

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : SOIL CONTAMINATION
UNIT USE : DISPOSAL
OPERATIONAL STATUS : INACTIVE
PERIOD OF USE : 1940s - 1960s
HAZARDOUS RELEASE : UNKNOWN
RADIOACTIVE RELEASE : UNKNOWN

MATERIALS MANAGED : HAZARDOUS WASTE
RADIOACTIVE WASTE

UNIT INFORMATION

It is possible that during the operation and decommissioning of the following magazines, the soil beneath them became contaminated. The magazines were flash-burned prior to demolition, due to health and safety concerns.

SWMU NO.	STRUCTURE	DATE OF REMOVAL	SWMU NO.	STRUCTURE	DATE OF REMOVAL
16-024(a)	TA-16-488	1951	16-024(l)	TA-16-72	1960
16-024(b)	TA-16-74	1960	16-024(m)	TA-16-66	1960
16-024(c)	TA-16-30	1960	16-024(n)	TA-16-84	1960
16-024(d)	TA-16-34	1960	16-024(o)	TA-16-67	1960
16-024(e)	TA-16-33	1960	16-024(p)	TA-16-70	1960
16-024(f)	TA-16-493	1960	16-024(q)	TA-16-71	1960
16-024(g)	TA-16-494	1960	16-024(r)	TA-16-68	1960
16-024(h)	TA-16-497	1960	16-024(s)	TA-16-60	1960
16-024(i)	TA-16-64	1951	16-024(t)	TA-16-424	1966
16-024(j)	TA-16-65	1951	16-024(u)	TA-16-481	1951
16-024(k)	TA-16-57	1960	16-024(v)	TA-16-62	1968

WASTE INFORMATION

The waste consists primarily of HE. TA-16-497 may have had depleted uranium, Strontium-90, and barium.

RELEASE INFORMATION

It is unknown whether the contaminated magazines released hazardous waste to the soil.

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-024(a)	TA16-1-CA-I-HW		Tsk 12 : 131	TA-16-488
16-024(b)	TA16-1-CA-I-HW		Tsk 13 : 275	TA-16-74
16-024(c)	TA16-1-CA-I-HW		Tsk 13 : 276	TA-16-30
16-024(d)	TA16-1-CA-I-HW		Tsk 13 : 277	TA-16-34
16-024(e)	TA16-1-CA-I-HW		Tsk 13 : 326	TA-16-33
16-024(f)	TA16-1-CA-I-HW TA24-1-CA-I-HW/RW		Tsk 13 : 384	TA-16-493
16-024(g)	TA16-1-CA-I-HW TA24-1-CA-I-HW/RW		Tsk 13 : 385	TA-16-494
16-024(h)	TA16-1-CA-I-HW TA24-1-CA-I-HW/RW		Tsk 13 : 387	TA-16-497
16-024(i)	TA16-1-CA-I-HW		Tsk 13 : 547	TA-16-64
16-024(j)	TA16-1-CA-I-HW		Tsk 14 : 548	TA-16-65
16-024(k)	TA16-1-CA-I-HW		Tsk 14 : 549	TA-16-57
16-024(l)	TA16-1-CA-I-HW		Tsk 14 : 550	TA-16-72
16-024(m)	TA16-1-CA-I-HW		Tsk 14 : 551	TA-16-66
16-024(n)	TA16-1-CA-I-HW		Tsk 14 : 552	TA-16-84
16-024(o)	TA16-1-CA-I-HW		Tsk 14 : 553	TA-16-67
16-024(p)	TA16-1-CA-I-HW		Tsk 14 : 554	TA-16-70
16-024(q)	TA16-1-CA-I-HW		Tsk 14 : 555	TA-16-71

(continued)

SWMU CROSS-REFERENCE LIST
(continued)

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-024(r)	TA16-1-CA-I-HW		Tsk 14 : 556	TA-16-68
16-024(s)	TA16-1-CA-I-HW		Tsk 14 : 557	TA-16-60
16-024(t)	**		Tsk 14 : 558	TA-16-424
16-024(u)	TA16-1-CA-I-HW		Tsk 12 : 60	TA-16-481
16-024(v)	TA16-1-CA-I-HW		Tsk 14 : 542	TA-16-62

** No corresponding E. R. Program unit.

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : SOIL CONTAMINATION
UNIT USE : DISPOSAL
OPERATIONAL STATUS : INACTIVE
PERIOD OF USE : 1940s - 1960s
HAZARDOUS RELEASE : UNKNOWN
RADIOACTIVE RELEASE : UNKNOWN

MATERIALS MANAGED : HAZARDOUS WASTE
MIXED WASTE

UNIT INFORMATION

It is possible that, during the operation and decommissioning of the following HE facilities, the soil beneath the buildings became contaminated. The facilities were flash-burned prior to demolition due to health and safety concerns.

SWMU NO.	STRUCTURE NO.	REMOVED	BUILDING OPERATION
16-025(a)	TA-16-39	1966	radiograph
16-025(b)	TA-16-40	1966	radiograph
16-025(c)	TA-16-35	1960	equipment room
16-025(d)	TA-16-94	1960	equipment and control
16-025(e)	TA-16-31	1961	HE machining
16-025(f)	TA-16-32	1960	HE machining
16-025(g)	TA-16-95	1960	HE machining
16-025(h)	TA-16-96	1960	HE machining
16-025(i)	TA-16-97	1960	HE machining
16-025(j)	TA-16-98	1960	HE machining
16-025(k)	TA-16-25	1961	HE casting and electroplating
16-025(l)	TA-16-26	1968	HE casting
16-025(m)	TA-16-495	1960	X-ray hutment
16-025(n)	TA-16-499	1960	X-ray hutment
16-025(o)	TA-16-500	1960	X-ray hutment
16-025(p)	TA-16-44	1960	physical inspection
16-025(q)	TA-16-45	1960	X-ray building
16-025(r)	TA-16-46	1960	in-process storage
16-025(s)	TA-16-48	1960	smoking room
16-025(t)	TA-16-38	1960	equipment casting
16-025(u)	TA-16-42	1960	melting and casting
16-025(v)	TA-16-43	1960	casting
16-025(w)	TA-16-81	1960	nitrocellulose drying
16-025(x)	TA-16-100	1960	HE process
16-025(y)	TA-16-55	1960	HE grinding
16-025(z)	TA-16-37	1960	explosives testing
16-025(a2)	TA-16-50	1960	experimental casting
16-025(b2)	TA-16-52	1960	HE casting
16-025(c2)	TA-16-56	1960	HE testing lab
16-025(d2)	TA-16-480	1951	firing chamber
16-025(e2)	TA-16-106	1949	HE storage
16-025(f2)	TA-16-107	1950	HE storage
16-025(g2)	TA-16-108	1950	HE storage
16-025(h2)	TA-16-109	1950	HE storage

WASTE INFORMATION

The waste consists primarily of HE. TA-16-495 and -39 may have used radioactive materials in addition to HE.

RELEASE INFORMATION

It is unknown whether the buildings have caused a release to the soil. LANL personnel indicated that soils were excavated and removed until a concentration of 0.5% HE was reached.

(continued)

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-025(a)	TA16-1-CA-I-HW		Tsk 13 : 255	TA-16-39
16-025(a2)	TA16-1-CA-I-HW		Tsk 14 : 619	TA-16-50
16-025(b)	TA16-1-CA-I-HW		Tsk 13 : 256	TA-16-40
16-025(b2)	TA16-1-CA-I-HW		Tsk 14 : 620	TA-16-52
16-025(c)	TA16-1-CA-I-HW		Tsk 13 : 257	TA-16-35
16-025(c2)	TA16-1-CA-I-HW		Tsk 14 : 621	TA-16-56
16-025(d)	TA16-1-CA-I-HW		Tsk 13 : 258	TA-16-94
16-025(d2)	TA16-1-CA-I-HW		Tsk 12 : 63	TA-16-480
16-025(e)	TA16-1-CA-I-HW		Tsk 13 : 324	TA-16-31
16-025(e2)	TA16-1-CA-I-HW		Tsk 14 : 543	TA-16-106
16-025(f)	TA16-1-CA-I-HW		Tsk 13 : 325	TA-16-32
16-025(f2)	TA16-1-CA-I-HW		Tsk 14 : 544	TA-16-107
16-025(g)	TA16-1-CA-I-HW		Tsk 13 : 327	TA-16-95
16-025(g2)	TA16-1-CA-I-HW		Tsk 14 : 545	TA-16-108
16-025(h)	TA16-1-CA-I-HW		Tsk 13 : 328	TA-16-96
16-025(h2)	TA16-1-CA-I-HW		Tsk 14 : 546	TA-16-109
16-025(i)	TA16-1-CA-I-HW		Tsk 13 : 329	TA-16-97
16-025(j)	TA16-1-CA-I-HW		Tsk 13 : 330	TA-16-98
16-025(k)	TA16-1-CA-I-HW		Tsk 13 : 331	TA-16-25
16-025(l)	TA16-1-CA-I-HW		Tsk 13 : 332	TA-16-26
16-025(m)	TA16-1-CA-I-HW TA24-1-CA-I-HW/RW		Tsk 13 : 379	TA-16-495
16-025(n)	TA16-1-CA-I-HW TA24-1-CA-I-HW/RW		Tsk 13 : 380	TA-16-499
16-025(o)	TA16-1-CA-I-HW TA24-1-CA-I-HW/RW		Tsk 13 : 381	TA-16-500
16-025(p)	TA16-1-CA-I-HW		Tsk 14 : 507	TA-16-44
16-025(q)	TA16-1-CA-I-HW		Tsk 14 : 508	TA-16-45
16-025(r)	TA16-1-CA-I-HW		Tsk 14 : 537	TA-16-46
16-025(s)	TA16-1-CA-I-HW		Tsk 14 : 538	TA-16-48
16-025(t)	TA16-1-CA-I-HW		Tsk 14 : 612	TA-16-38
16-025(u)	TA16-1-CA-I-HW		Tsk 14 : 613	TA-16-42
16-025(v)	TA16-1-CA-I-HW		Tsk 14 : 614	TA-16-43
16-025(w)	TA16-1-CA-I-HW		Tsk 14 : 615	TA-16-81
16-025(x)	TA16-1-CA-I-HW		Tsk 14 : 616	TA-16-100
16-025(y)	TA16-1-CA-I-HW		Tsk 14 : 617	TA-16-55
16-025(z)	TA16-1-CA-I-HW		Tsk 14 : 618	TA-16-37

SUMMARY

LOCATION : TA-16
TYPE OF UNIT(s) : OUTFALL
UNIT USE : DISPOSAL
OPERATIONAL STATUS : ACTIVE
PERIOD OF USE : 1940s - PRESENT
HAZARDOUS RELEASE : KNOWN
RADIOACTIVE RELEASE : NONE

MATERIALS MANAGED : HAZARDOUS WASTE
SOLID WASTE

UNIT INFORMATION

The following table lists outfalls resulting from cooling towers, blowdown tanks, and noncontact cooling water.

SWMU NO.	STRUCTURE	DESCRIPTION
16-028(a)	TA-16-228	A drainage system discharges to the canyon between TA-16-228 and the closed liquid impoundment
16-028(a)	TA-16-228	Outfall discharges water from the treatment of HE sludge through an activated charcoal treatment facility (EPA05A055; see Appendix A)
16-028(b)	TA-16-370	Outfall from west side of building discharges treated cooling water (EPA03A092; see Appendix A)
16-028(c)	TA-16-220	Outfall discharges noncontact cooling water (EPA04A070; see Appendix A)
16-028(d)	TA-16-202	An outfall originating at the southeast side of the machine discharges noncontact cooling water
16-028(e)	TA-16-450	Outfall originates from the southeast side of TA-16-450 (EPA04A091; see Appendix A)

WASTE INFORMATION

The outfall between TA-16-228 and the impoundment may discharge HE and, in the past, may have discharged barium. The TA-16-228 outfall discharges hazardous waste. The outfalls from TA-16-220, -202, and -450 discharge noncontact cooling water. The outfall from TA-16-370 possibly discharges solvents and, in the past, possibly discharged barium.

RELEASE INFORMATION

It is unknown whether hazardous releases have occurred from outfalls TA-16-228, -220, and -202. The Environmental Restoration Release Site Database indicates that barium has been identified in soil samples collected 50 yards south of TA-16-370.

SWMU CROSS-REFERENCE LIST

SWMU NUMBER	CEARP IDENTIFICATION NUMBER(S)	RFA UNIT	E.R. RELEASE SITE INFO.	ASSOCIATED STRUCTURES
16-028(a)	**		Tsk 12 : 102 88	TA-16-228
16-028(b)	**		Tsk 12 : 94	TA-16-370
16-028(c)	**		Tsk 12 : 223 224 225	TA-16-220
16-028(d)	**		Tsk 14 : 415	TA-16-202
16-028(e)	**		Tsk 14 : 438	TA-16-450

** No corresponding E. R. Program unit.

11.0 OTHER FEDERAL LAWS

The following federal laws are required under the New Mexico Administrative Code 20, Chapter 4, Part 1, Subpart IX, 270.3 and 270.14(b)(20), to be given consideration when applying for a Resource Conservation and Recovery Act permit. When any of these laws is applicable, its procedures must be followed:

1. *The Wild and Scenic Rivers Act (16 USC 1273 et seq.).* This act provides for a national wild and scenic rivers system and prohibits construction of any waterway that would have a direct adverse effect on the values for which a wild and scenic river was established.

2. *The National Historic Preservation Act of 1966 (16 USC 470 et seq.).* This act establishes a program for the preservation of historic properties throughout the country. The act has provisions that require mitigation of adverse effects to registered properties.

3. *The Endangered Species Act of 1973 (16 USC 1531).* This act provides for the conservation of endangered and threatened species of fish, wildlife, and plants. It prohibits any action that would jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat.

4. *The Coastal Zone Management Act of 1972 (16 USC 1451 et seq.).* This act establishes national policy for the management, use, protection, and development of land and water resources of the nation's coastal zones. Section 307(c) of the act and implementing regulations prohibit the U.S. Environmental Protection Agency from issuing a permit for activity affecting coastal zone land or water without the certification from the applicant that the activity is in compliance with the state Coastal Zone Management Program.

5. *The Fish and Wildlife Act of 1934, as amended (16 USC 661 et seq.).* This act promotes the conservation of wildlife, fish, and game, and integrates this conservation with water resource projects. Certain provisions of the act require that permits proposing or authorizing the impoundment, diversion, or other control or modification of any body of water be considered by the appropriate state agency for impacts to wildlife resources.

Because Los Alamos National Laboratory (LANL) has ongoing programs in support of the National Historic Preservation Act, the Endangered Species Act, and the Fish and Wildlife Act, consideration was given to these federal laws. Provisions in the Wild and Scenic Rivers Act and the Coastal Zone Management Act are not applicable to LANL's activities.

12.0 CERTIFICATION

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

Dennis J. Erickson
Division Director for Environment, Safety, and Health Division
Los Alamos National Laboratory
Operator

June 26, 1995
Date Signed

Larry D. Kirkman
Acting Area Manager, Los Alamos Area Office
U.S. Department of Energy
Albuquerque Operations
Owner/Operator

6/28/95
Date Signed

13.0 LIST OF REFERENCES

Abeele, W. V., M. L. Wheeler, and B. W. Burton, 1981, "Geohydrology of Bandelier Tuff," LA-8962-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

AEHA, See U.S. Army Environmental Hygiene Agency.

Aldrich, M. J., and D. P. Dethier, 1990, "Stratigraphic and Tectonic Evolution of the Northern Española Basin, Rio Grande Rift, New Mexico," *Geological Society of America Bulletin*, Vol. 102, No. 12, pp. 1695-1705.

Aldrich, M. J., Jr., 1986, "Tectonics of the Jemez Lineament in the Jemez Mountains and Rio Grande Rift," *Journal of Geophysical Research*, Vol. 91, pp. 1753-1762.

Bailey, R. A., R. L. Smith, and C. S. Ross, 1969, "Volcanic Rocks in the Jemez Mountains, New Mexico," in Contributions to Stratigraphy, U.S. Geological Survey Bulletin 1274-P, Washington, D.C., pp. 29.

Baldridge, W. S., P. E. Damon, M. Shafiqullah, and R. J. Bridwell, 1980, "Evolution of the Central Rio Grande Rift, New Mexico: New Potassium-Argon Ages," in *Earth and Planetary Science Letters*, Vol. 51, pp. 309-321.

Biehler, S., J. Ferguson, W. S. Baldridge, G. R. Jiracek, J. L. Aldern, M. Martinez, R. Fernandez, J. Romo, B. Gilpin, L. W. Braile, D. R. Hersey, B. P. Luyendyk, and C. L. Aiken, 1991, "A Geophysical Model of the Española Basin, Rio Grande Rift, New Mexico," in *Geophysics*, Vol. 56, No. 3, pp. 340-343.

Biological Resource Evaluations Team (BRET), 1993, "Biological and Floodplain/Wetland Assessment for Environmental Restoration Program Operable Unit 1082".

Conover, C. S., C. V. Theis, and R. L. Griggs, 1963, "Geology and Hydrology of Valle Grande and Valle Toledo, Sandoval County, New Mexico," U.S. Geological Survey Water Supply Paper 1619-Y, Washington, D.C.

Crowe, B. M., G. W. Linn, G. Heiken, and M. L. Bevier, 1978, "Stratigraphy of the Bandelier Tuff in the Pajarito Plateau, Applications to Waste Management," LA-7225-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

Cushman, R. L., 1965, "An Evaluation of Aquifer and Well Characteristics of Municipal Well Fields in Los Alamos and Guaje Canyons near Los Alamos, New Mexico," U.S. Geological Survey Water Supply Paper 1809-D, Washington, D.C.

Dethier, D. P., C. D. Harrington, and M. J. Aldrich, 1988, "Late Cenozoic Rates of Erosion in the Western Española Basin, New Mexico: Evidence from Geologic Dating of Erosion Surfaces," *Geological Society of America Bulletin*, Vol. 100, pp. 928-937.

DOE, see U.S. Department of Energy.

Dransfield, B. J., and J. N. Gardner, 1985, "Subsurface Geology of the Pajarito Plateau, Española Basin, New Mexico," LA-10455-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

EPA, see U.S. Environmental Protection Agency.

Gallaher, B., Los Alamos National Laboratory, Water Quality and Hydrology Group, February 1, 1995, Memorandum ESH-18/WQ&H-95-0044.

Gardner, J. N., W. S. Baldridge, R. Gribble, K. Manley, K. Tanaka, J. W. Geissman, M. Gonzalez, and G. Baron, 1990, "Results from Seismic Hazards Trench #1 (SHT-1)

Los Alamos Seismic Hazards Investigations," Report No. EES1-SH90-19, Los Alamos National Laboratory, Los Alamos, New Mexico.

Gardner, J. N., and L. House, 1987, "Seismic Hazards Investigations at Los Alamos National Laboratory, 1984 to 1985," LA-11072-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

Gardner, J. N., F. Goff, S. Garcia, and R. C. Hagan, 1986, "Stratigraphic Relations and Lithologic Variations in the Jemez Volcanic Field, New Mexico," *Journal of Geophysical Research*, Vol. 91, pp. 1763-1778.

Gardner, J. N., and F. Goff, 1984, "Potassium-Argon Dates from the Jemez Volcanic Field: Implications for Tectonic Activity in the North-Central Rio Grande Rift," in New Mexico Geological Society Guidebook, *35th Field Conference, Rio Grande Rift, Northern New Mexico*, University of New Mexico, Albuquerque, New Mexico.

Goff, F., 1991, "Isotopic Results on Eight White Rock Canyon Springs," Los Alamos National Laboratory Memorandum EES-1, Geology/Geochemistry, from Fraser Goff to Alan Stoker, Los Alamos, New Mexico.

Goff, F., J. N. Gardner, and G. Valentine, 1990, "Geology of St. Peter's Dome Area, Jemez Mountains, New Mexico," Geologic Map 69, New Mexico Bureau of Mines & Mineral Resources, New Mexico Institute of Mining & Technology, Socorro, New Mexico.

Goff, F., J. N. Gardner, W. S. Baldridge, J. B. Hulen, D. L. Nielson, D. Vaniman, G. Heiken, M. A. Dungan, and D. Broxton, 1989, "Volcanic and Hydrothermal Evolution of Valles Caldera and Jemez Volcanic Field," in Field Excursions to Volcanic Terranes in the Western United States, Volume I: Southern Rocky Mountain Region, Memoir 46, C. E. Chapin and J. Zidek (Eds.), New Mexico Bureau of Mines & Mineral Resources, Socorro, New Mexico, pp. 381-434.

Griggs, R. L., and J. D. Hem, 1964, "Geology and Ground-Water Resources of the Los Alamos Area, New Mexico," U.S. Geological Survey Water Supply Paper 1753, Albuquerque, New Mexico.

Heiken, G., F. Goff, J. Stix, S. Tamanyu, M. Shafiqullah, S. Garcia, and R. C. Hagan, 1986, "Intracaldera Volcanic Activity, Toledo Caldera and Embayment, Jemez Mountains, New Mexico," *Journal of Geophysical Research*, Vol. 91, pp. 1799-1815.

Ingersoll, R. V., W. Cavazza, W. S. Baldridge, and M. Shafiqullah, 1990, "Cenozoic Sedimentation and Paleotectonics of North-Central New Mexico: Implications for Initiation and Evolution of the Rio Grande Rift," in *Geological Society of America Bulletin*, Vol. 102, pp. 1280-1296.

Kearl, P. M., J. J. Dexter, and M. Kautsky, 1986, "Vadose Zone Characterization of Technical Area 54, Waste Disposal Areas G and L, Los Alamos National Laboratory, New Mexico, Report 3: Preliminary Assessment of the Hydrogeologic System," Report GJ-44, Bendix Field Engineering Corporation, Grand Junction, Colorado.

Kelley, V. C., 1978, "Geology of Española Basin, New Mexico," Geologic Map 48, New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico.

LANL, see Los Alamos National Laboratory.

Los Alamos County, 1992, "Traffic Counts," Los Alamos County Public Works Department, Traffic Engineering Group.

Los Alamos County, 1991, "Traffic Count Diagram," Los Alamos County Public Works Department, Traffic Engineering Group.

Los Alamos National Laboratory (LANL), 1995, "Groundwater Protection Management Program Plan," Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1994a, "Environmental Surveillance at Los Alamos During 1992," LA-12764-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1994b, "RCRA Part A Permit Application for Mixed Waste," Rev. 2.0, Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1994c, "Storm Water Pollution Prevention Plan for Technical Area 16 Burn Ground," Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1993a, "RFI Work Plan for Operable Unit 1082," Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1993b, "Installation Work Plan for Environmental Restoration," Rev. 3, Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1993c, "Emergency Management Plan," Los Alamos National Laboratory, Emergency Management and Response Office, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1991, "RCRA Part A Permit Application for Mixed Waste," Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1990, "Solid Waste Management Units Report," Revision 1, LAUR 90-3400, Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1988, "RCRA Part B Permit Application," Rev. 4.1, Los Alamos National Laboratory, Los Alamos, New Mexico.

May, S. J., 1984, "Miocene Stratigraphic Relations and Problems Between the Abiquiu, Los Pinos, and Tesuque Formations Near Ojo Caliente, Northern Española Basin," in New Mexico Geological Society Guidebook, Santa Fe, New Mexico.

McLin, S. G., 1992, "Determination of 100-Year Floodplain Elevations at Los Alamos National Laboratory," LA-12195-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

New Mexico Environmental Improvement Board (NMEIB), 1994, "New Mexico Administrative Code Title 20," Chapter 4, Part 1, NMEID, Santa Fe, New Mexico.

Nyhan, J. W., L. W. Hacker, T. E. Calhoun, and D. L. Young, 1978, "Soil Survey of Los Alamos County, New Mexico," LA-6779-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

Pan Am World Services, Inc., 1986, "Asphalt Road Maintenance Report," Los Alamos National Laboratory, Los Alamos, New Mexico.

Purtymun, W. D., 1984, "Hydrologic Characteristics of the Main Aquifer in the Los Alamos Area: Development of Ground Water Supplies," LA-9957-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

Purtymun, W. D., M. N. Maes, and R. Peters, 1984, "Distribution of Moisture, Tritium, and Plutonium in the Alluvium Aquifer and Underlying Tuff in Mortandad Canyon," LA-10100-ENV, Los Alamos National Laboratory, Los Alamos, New Mexico.

Purtymun, W. D., W. R. Hansen, and R. J. Peters, 1983, "Radiochemical Quality of Water in the Shallow Aquifer in Mortandad Canyon 1967-1978," LA-9675-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

Purtymun, W. D., R. J. Peters, and J. W. Owens, 1980, "Geohydrology of White Rock Canyon of the Rio Grande from Otowi to Frijoles Canyon," LA-8635-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.

Purtymun, W. D., J. R. Buchholz, and T. E. Hakonsen, 1977, "Chemical Quality of Effluents and Their Influence on Water Quality in a Shallow Aquifer," *Journal of Environmental Quality*, Vol. 6, No. 1, pp. 29-32.

Purtymun, W. D., 1975, "Geohydrology of the Pajarito Plateau with Reference to Quality of Water, 1949-1972," LA-5744, Los Alamos National Laboratory, Los Alamos, New Mexico.

Purtymun, W. D., and W. R. Kennedy, 1971, "Geology and Hydrology of Mesita del Buey," LA-4660, Los Alamos National Laboratory, Los Alamos, New Mexico.

Self, S., D. E. Kircher, and J. A. Wolff, 1988, "The El Cajete Series, Valles Caldera, New Mexico," in *Journal of Geophysical Research*, Vol. 93, pp. 6113-6127.

Smith, R. L., R. A. Bailey, and C. S. Ross, 1970, "Geologic Map of the Jemez Mountains, New Mexico," U.S. Geological Survey Miscellaneous Investigations Series, Map I-571, Washington, D.C.

Smith, R. L., and R. A. Bailey, 1966, "The Bandelier Tuff - A Study of Ash-Flow Eruption Cycles from Zoned Magma Chambers," *Bulletin Volcanologique*, Vol. 29, pp. 83-104.

Spell, T. L., T. M. Harrison, and J. A. Wolf, 1990, "$^{40}Ar/^{39}Ar$ Dating of the Bandelier Tuff and San Diego Canyon Ignimbrites, Jemez Mountains, New Mexico: Temporal Constraints on Magmatic Evolution," *Journal of Volcanology and Geothermal Research*, Vol. 43, pp. 175-193.

Tewarson, A., 1985, "Prediction of Fire Properties of Fuels," Factory Mutual Research Corporation.

Turbeville, B. N., D. B. Waresback, and S. Self, 1989, "Lava-Dome Growth and Explosive Volcanism in the Jemez Mountains, New Mexico: Evidence from the Plio-Pleistocene Puye Alluvial Fan," *Journal of Volcanology and Geothermal Research*, Vol. 36, pp. 267-291.

U.S. Army Environmental Hygiene Agency (AEHA), 1987, "RCRA Part B Permit Writers' Guidance for Department of Defense Open Burning/Open Detonation Units," U.S. Army Environmental Hygiene Agency, Aberdeen Proving Ground, Maryland.

U.S. Department of Energy (DOE), 1988, "Radioactive Waste Management," *DOE Order 5820.2A*, U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE), 1987, Letter from the U.S. Department of Energy to the New Mexico Environmental Improvement Division.

U.S. Environmental Protection Agency (EPA), 1995, *Federal Register*, Volume 60, No. 9, pp. 3089-3095.

U.S. Environmental Protection Agency (EPA), 1994a, "Module VIII: Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments to RCRA for Los Alamos National Laboratory, EPA I.D. NM0890010515," effective date May 19, 1994, U.S. Environmental Protection Agency, Region 6, Hazardous Waste Management Division, Dallas, Texas.

U.S. Environmental Protection Agency (EPA), 1994b, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," OSWER 9938.4-03, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

RCRA Part B Permit Application
Volume II

Technical Area 16

Building 88, Container Storage Area
Flash Pads 387 and 388, Open Burn Units
Burn Pads 388 and 399, Open Burn Units
Burn Trays 388 and 394, Open Burn Units
Filter Vessels 401 and 406, Open Burn Units

Prepared by:
Los Alamos National Laboratory
Hazardous and Solid Waste Group (ESH-19)
Los Alamos, New Mexico 87545

June 1995
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APPENDIX A

Determination of 100-Year Floodplain Elevations at Los Alamos National Laboratory

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Determination of 100-Year Floodplain Elevations at Los Alamos National Laboratory

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Los Alamos, New Mexico 87545

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DETERMINATION OF 100-YEAR FLOODPLAIN ELEVATIONS AT LOS ALAMOS NATIONAL LABORATORY

by

Stephen G. McLin

ABSTRACT

Under existing permit requirements, the US Environmental Protection Agency stipulates that facilities regulated by the Resource Conservation and Recovery Act must delineate all 100-yr floodplain elevations within their boundaries. At Los Alamos these floodplains are located within ungaged watersheds that drain Pajarito Plateau. This report documents the floodplain computational mapping procedure and, along with supporting maps, is intended to satisfy this permit requirement.

The floodplain mapping procedure outlined here uses topographic data from AUTOGIS Mapping Overlay Statistical System (AUTOGIS-MOSS), a graphical information system database. About 65% of the Laboratory has 2-ft topographic contour interval coverage, while 35% has 10-ft coverage. Targeted stream channel segments are initially specified in the MOSS system, and topographic profiles of stream channel cross sections at user-designated intervals are extracted automatically. Each 2-D profile is stored as a 3-D MOSS line feature using New Mexico state plane coordinates. This procedure is initiated at a convenient downstream location within each watershed and is continued upstream to a selected termination point. These 3-D line features are then exported in a format that satisfies the US Army Corps of Engineers' (COE's) Water-Surface Profiles (HEC-2) input data requirements.

The COE's computer-based Flood Hydrograph Package (HEC-1) and HEC-2 were used on a PC-type microcomputer to perform floodplain hydrology simulations. HEC-1 generates storm hydrographs at selected channel locations within each ungaged watershed. This information, along with the stream channel geometry extracted from the MOSS system, is then used by HEC-2 to define each floodplain. The approach used here employs a 100-yr, 6-h design storm event for Los Alamos, but alternative floodplain elevations produced by different storm events are easily computed.

The HEC-2-computed water-surface elevations for each channel section, along with the left and right channel stations where this water surface intersects the ground, are read back into the MOSS system. This information is then transformed within MOSS to determine local geographically referenced coordinates that uniquely define the 100-yr floodpool. Finally, these paired coordinates are linked together as MOSS-area features to identify each watershed floodplain. In this particular application, 11 separate watersheds traverse LANL lands; individual channels range up to 9 mi in length. The 100-yr floodplain was defined on each channel segment at 250-ft intervals, and detailed 1:4800-scale maps were generated.

I. INTRODUCTION

The US Environmental Protection Agency (EPA) stipulates that all regulated hazardous waste treatment, storage, and disposal facilities must apply for a Resource Conservation and Recovery Act (RCRA) operating permit. Under EPA authority, the New Mexico Environment Department issued the US Department of Energy (DOE) and Los Alamos National Laboratory (LANL) a RCRA hazardous waste facility operating permit in November 1989. The EPA issued DOE and LANL the Hazardous and Solid Waste Amendments (HSWA) portion of that permit in March 1990. As a condition to the HSWA portion of the permit, LANL was required to define all 100-yr floodplain elevations within the facility boundary [40 CFR 270.14(b)(11)(iii)]. These floodplain elevations must be consistent with National Flood Insurance Program maps produced for the Federal Insurance Administration (FIA), or must use an equivalent method of mapping. Before this HSWA permit condition was mandated, these floodplain boundary locations had never been completely mapped within the LANL complex. This report describes a methodology that is recognized by the EPA and others (i.e., FIA, US Army Corps of Engineers (COE), US Bureau of Reclamation, and US Soil Conservation Service) as being an approved technique for defining floodplain elevations in ungaged watersheds.

Actual floodplain-modeling efforts used the COE Hydrologic Engineering Center (HEC) computer-based Flood Hydrograph model (HEC-1) and the Water-Surface Profiles model (HEC-2). Both the HEC-1 and HEC-2 computer programs are classified as single-event simulation models, as opposed to continuous-simulation streamflow models like the Stanford or Kentucky Watershed Models. Continuous-simulation models require extensive system observation, which is not available at LANL. Event-simulation models, on the other hand, allow greater flexibility in using distributed parameters and short time increments. They also require considerably less field observation to support input data requirements. In addition, the HEC-1 and HEC-2 event-simulation models are recognized by the EPA and COE as state-of-the-art simulation models for ungaged watershed applications.

HEC-1 is used to simulate either real or hypothetical storm hydrographs in ungaged or gaged watersheds in response to user-specified rainfall hyetographs. As used here, HEC-1 employs a traditional 100-yr, 6-h design storm event for Los Alamos, although any alternative return-period event can easily be incorporated. A representative 100-yr, 6-h design storm event is recommended by the COE for defining 100-yr floodplains in northern New Mexico (M. Magnuson, US Army COE, Albuquerque, personal communication, 1989). Predicted HEC-1 hydrograph peaks at various stream channel locations, along with stream channel geometry and watershed basin characteristics, are used by HEC-2 to compute 100-yr floodplain elevations.

Topographic profiles of stream channel cross sections at various locations were obtained from LANL's AUTOGIS computer-based Mapping Overlay Statistical System (AUTOGIS-MOSS), a graphic information system database copyrighted by Autometric, Inc. About 65% of LANL has 2-ft topographic-contour interval coverage, while 35% has 10-ft coverage. Targeted stream channel segments were initially specified in the MOSS system, and topographic profiles of cross sections at user-designated intervals along segments were extracted automatically. Each 2-D topographic profile was stored as a 3-D MOSS line feature using New Mexico state plane coordinates. This procedure was initiated at the intersection of the eastern DOE-LANL facility boundary and each watershed stream channel and was continued upstream to the western facility boundary. These 3-D line features were then exported in a format satisfying HEC-2 model input data requirements. Appendix A describes how to use the AUTOGIS-MOSS data extraction programs developed for this project; actual source code listings (LA-CC 91-3) are contained in Disk No. 1 attached to this report.

HEC-2 is used to compute floodplain elevations that are associated with user-specified hydrograph peaks. Floodplain elevations for 11 separate watersheds that included all major tributaries were defined at 250-ft intervals along stream channels within the DOE-LANL boundary. These watersheds are depicted in Fig. 1; they were subdivided into 52 separate subbasins. Peak floods were also defined with HEC-1 for two additional watersheds having a total of eight separate subbasins; however, these later watersheds do not cross the DOE-LANL facility boundary. The HEC-1

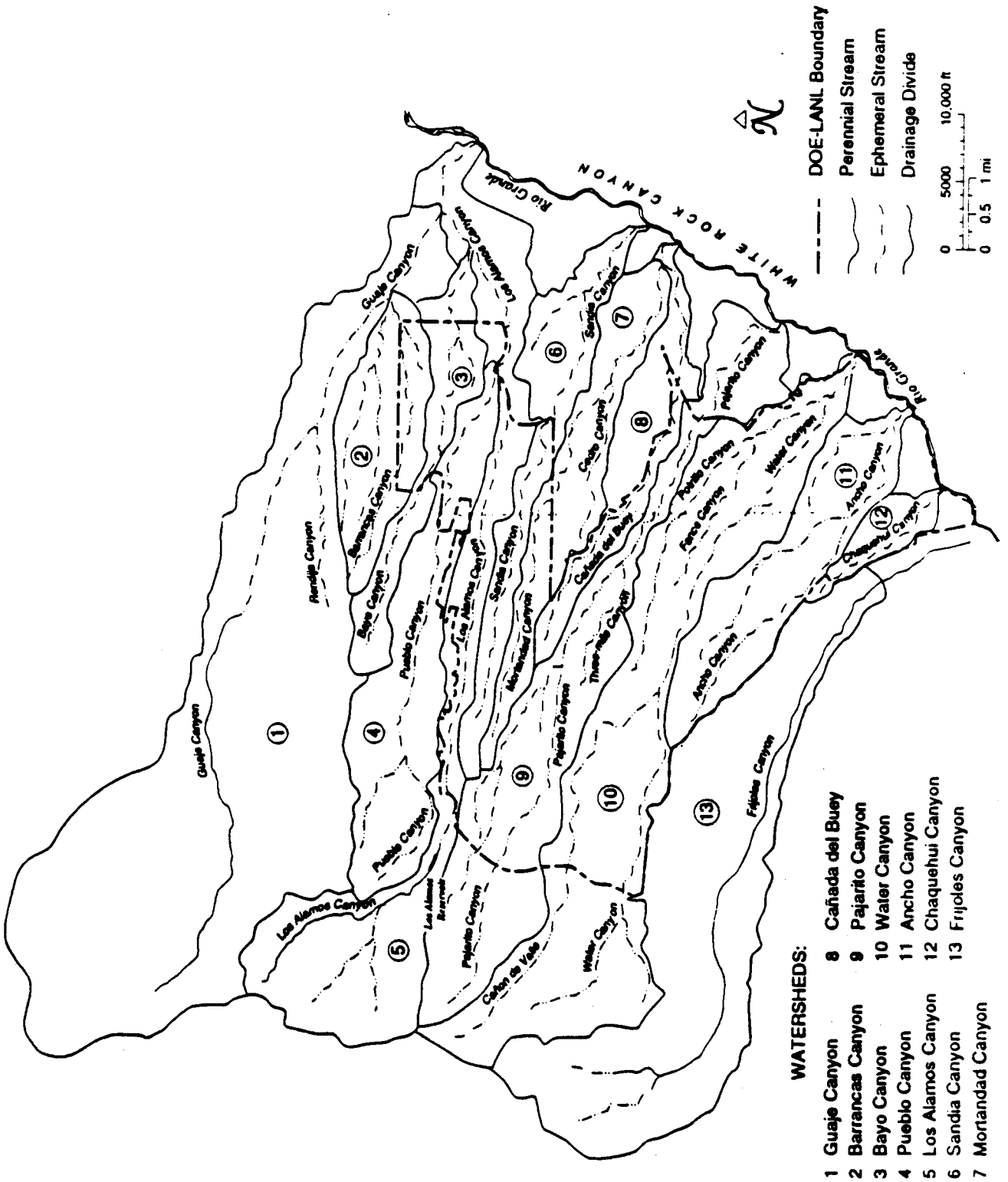


Fig. 1. Major watersheds at Los Alamos (see Table 1).

and HEC-2 input data files used to generate these hydrograph peaks and floodplain elevations are contained on disks numbered 1 and 2 attached to this report. Parameter estimation procedures and construction of input data files, including the AUTOGIS-MOSS data extraction technique used to define topographical profiles of stream channel cross sections, are described in the sections below. Once all floodplains had been defined by HEC-2, then this information was read back into the MOSS system. These data were then transformed within MOSS to determine New Mexico state plane geographically referenced coordinates that uniquely define the 100-yr floodpool at each stream cross section. Finally 1:4800-scale maps depicting the DOE-LANL boundary and all 100-yr floodplains were prepared. This packet of maps is maintained on file in LANL's Facilities Engineering Planning Group office (ENG-2 File Number R-7160) and in the Geology and Geochemistry Group office (EES-1). This report documents the identification of these floodplain elevations and, along with the above-referenced maps, is intended to satisfy the RCRA/HSWA permit requirement that all 100-yr floodplains within the DOE-LANL facility be mapped.

II. COMPUTATIONAL METHODOLOGY

Predicting peak discharge rates and synthesizing complete discharge hydrographs for use in defining floodplain areas within ungaged watersheds are two challenging tasks in engineering hydrology. Most designs involve hydrologic analyses based upon a critical flood that imitates some hypothetical future storm event. Ideally these analyses are based on long-term rainfall-runoff observations. At LANL sufficient stream flow records are not available to support these analyses, although an extensive rain gage network with a lengthy precipitation record lends support (Bowen 1990). Hence, one may be tempted to employ some regional analysis technique, or use empirical-correlative methods. However these approaches may not accurately simulate the rainfall-runoff process. An example illustrates this point.

The US Geological Survey (USGS) has produced probabilistic techniques to estimate peak discharges in New Mexico's streams (Waltemeyer 1986; Thomas and Gold 1982; Scott 1971; and Borland 1970). These USGS studies define the regional magnitude and flood frequency within New Mexico stream channels using multiple regression techniques for the 2-, 5-, 10-, 25-, 50-, and 100-yr storm events. The empirical equations used are valid for specific watersheds under a wide range of climatic basin conditions that are considerably different from those at Los Alamos. Furthermore, these USGS studies yield significant errors in applications for which gaging records are available for direct comparison. Finally, these techniques were not intended to satisfy the RCRA/HSWA permit condition requiring floodplain definition. A direct comparison between the USGS and HEC-1 hydrograph peaks is presented later in this report.

Other analytical tools are also available to perform floodplain analyses; Viessman, et al. (1977) have summarized many of these approaches. However, the LANL site is contained within a system of ungaged, interconnected, watersheds with ephemeral stream drainage. Hence, most of these alternative approaches would not produce acceptable results. The reason for this centers around the general shape of watersheds within the LANL complex. These watersheds are elongated in the east/west direction along Pajarito Plateau, but they are extremely narrow in the north/south direction. This atypical watershed shape, coupled with variability in surficial soil type and vegetation cover, yields fairly typical rainfall-runoff time-of-concentration values for each subbasin within an individual watershed. Here, time of concentration is defined as the flow time from the most remote point in a drainage subbasin area to its outlet point. However, as one moves downstream these subbasin time-of-concentration values and unusual watershed configurations combine to yield hydrograph peaks that are atypically amplified. Hence, one tends to actually observe longer-duration runoff events with lower corresponding hydrograph peaks than some simple models would predict.

When one considers the particular application at LANL, the deterministic approach using unit hydrograph theory commonly employed by the US Army COE, the US Soil Conservation Service (SCS), and US Bureau of Reclamation is clearly appropriate. This approach is incorporated into the HEC-1 model and generates stream hydrographs at specific channel locations. An entire watershed is represented by an interconnected group of subbasins. Each subbasin generates an individual unit

hydrograph that simulates important hydrologic rainfall-runoff relationships, which are reflected by average subbasin characteristics. Individual subbasin hydrographs are then hydraulically routed downstream and combined with other stream-connected, subbasin hydrographs. These HEC-1 peak hydrograph values are subsequently read into the HEC-2 model as a function of channel distance. HEC-2 then simulates the 100-yr water-surface elevation using a steady, gradually varied flow approximation. An iterative, standard-step method was used to compute this water-surface elevation as a function of channel distance.

Several key HEC-1 parameters represent average nonlinear temporal and spatial processes within each subbasin; they include antecedent moisture conditions, soil types, and land cover. HEC-1 also requires that a design rainfall amount and temporal distribution be specified as input data. Hence, the unit hydrograph approach is quite flexible. In addition, the HEC-1 and HEC-2 models also require basic watershed topographic and geometric characteristics, topographic profiles of stream cross sections, and bed-roughness factors as a function of channel length. All of this information for LANL watersheds was available from the MOSS mapping system or was readily obtained during short field investigations.

III. HEC-1 FLOOD HYDROGRAPH PACKAGE

A. General Model Description

HEC-1 is the most widely accepted method for systematically computing runoff hydrographs in complex watersheds. It is a general-purpose model consisting of a calling program and six subroutines. Two of the subroutines determine the optimal unit hydrograph, channel loss rate, and streamflow-routing parameters. Other subroutines perform snowmelt-runoff, unit hydrograph, hydrograph-routing, and combination computations and hydrograph-balancing operations. HEC-1 is capable of simulating a single-storm rainfall-runoff process or computing multiple floods for the same watershed during planning studies. It can be used to forecast both pre- and post-construction flooding impacts associated with development activities. Output from the model includes design storm hydrographs at specified channel locations within the watershed. HEC-1 output is then used by the HEC-2 model as input data.

Table 1 summarizes major watersheds draining the DOE-LANL facility complex. Figure 1 shows approximate watershed locations; detailed maps are referenced later in this report. Because watershed basins within the facility complex are ungaged, the SCS synthetic unit hydrograph technique was used to characterize the relationship between rainfall-runoff and flood peak discharges. Although HEC-1 can use either the Clark, Snyder, or SCS synthetic unit hydrograph approach, the latter was selected for reasons listed below. Furthermore, the SCS rainfall-abstraction rate was also used, as this paper will describe later. Finally, by using a variety of techniques, including modified Puls, Muskingum, kinematic wave, working R&D, and level-pool reservoir routing, HEC-1 can route computed flood flows through downstream subbasins. The Muskingum method was selected for channel routing because channel losses and flood wave attenuations in individual watersheds have not been fully characterized. Hence, these losses were assumed to be zero, even though they are known to be relatively high in certain stream channel segments. It should be emphasized that a relatively conservative design philosophy was followed here; whenever specific observational data were not available, an approach that would tend to yield larger peak hydrographs at a particular channel location was taken. It should also be noted that the HEC-1 model is extremely flexible; however, only those particular features that were used in this study are explained in detail. The interested reader is referred to the HEC-1 user's manual (US Army COE 1990) for additional model descriptions and to Viessman et al. (1977) for general hydrologic principles. Finally, it should be noted that the June 1988 FORTRAN version of HEC-1, published as PROHEC1 (March 1990 release) by Dodson & Associates, Inc., of Houston, Texas, was used in this study.

Table 1. Watersheds draining the eastern DOE-LANL boundary. See Figure 1 for approximate locations.

MAJOR WATERSHED NAME	TECH AREAS WITHIN WATERSHED
1. GUAJE CANYON WATERSHED	Outside DOE-LANL Boundary, Guaje municipal well field.
2. BARRANCAS CANYON WATERSHED	None.
3. BAYO CANYON WATERSHED	None.
4. PUEBLO CANYON WATERSHED	Historic LANL Sites, O-1 water well, and airport.
5. LOS ALAMOS CANYON WATERSHED a. Canada Bonito Tributary b. Quemazon Canyon Tributary	Historic LANL Sites, 3, 43, 41, 2, 21, 53, airport, O-4 water well, and Los Alamos municipal well field.
6. SANDIA CANYON WATERSHED	3, 53, municipal landfill, PM-1 and PM-3 water wells.
7. MORTANDAD CANYON WATERSHED a. Ten Site Canyon Tributary	3, 48, 55, 42, 50, 35, 52, and 5.
8. CANADA DEL BUEY WATERSHED	52, 5, 46, 51, 54, and PM-4 and PM-5 water wells.
9. PAJARITO CANYON WATERSHED a. Two-Mile Canyon Tributary b. Three-Mile Canyon Tributary	3, 58, 6, 8, 9, 22, 59, 69, 14, 15, 51, 18, 54, and PM-2 water supply well.
10. WATER CANYON WATERSHED a. Ski Lodge Canyon Tributary b. Canon de Valle Tributary c. Potrillo Canyon Tributary d. Fence Canyon Tributary	16, 9, 14, 11, 37, 28, 49, and 15. 15 and 36.
11. ANCHO CANYON WATERSHED a. Unnamed Tributary at State Road 4 b. Unnamed Tributary near Rio Grande	49, 33, and 39.
12. CHAQUEHUI CANYON WATERSHED	33.
13. FRIJOLES CANYON WATERSHED	Outside DOE-LANL Boundary

B. Design Storm Events for Los Alamos

Obviously, a particular storm hydrograph for a given watershed is intimately related to the spatial and temporal storm distribution pattern generating that hydrograph. Hence, in this report we describe the 100-yr, 6-h design storm event that produces the 100-year floodplain for Los Alamos. The reader should note that other 100-yr storm durations (for example, the 100-yr, 24-h event) may produce different 100-yr floodplain definitions. Each of these aspects is described below.

Establishing a design storm event requires several important steps. These include specification of (1) storm frequency or return period; (2) storm duration, total rainfall depth, and watershed area adjustment; and (3) storm temporal distribution and duration of rainfall excess. The EPA stipulates that RCRA-permitted facilities must use the 100-yr storm to define all floodplains [40 CFR 270.14(b)(11)(iii)]. The US Army COE recommends that a 6-h storm event be used in 100-yr HEC-1 flood simulations for northern New Mexico. In addition, rainfall depths have been tabulated for Los Alamos County (Bowen 1989). Owing to the small size of individual subbasin watersheds within the Laboratory complex (typically less than 5 sq mi), no areal adjustment was made for these rainfall depths. Hence factors (1) and (2) above are fixed by institutional constraints and system observations. The recommended design rationale for factor (3) is described below.

A representative rainfall hyetograph that is based on either the worst-possible storm distribution pattern or on recorded storm distribution patterns must be selected. This hyetograph will significantly affect the shape and peak value of the resulting runoff hydrograph for a given watershed. Precipitation depths have been measured daily in Los Alamos since 1911 (Bowen 1990). Individual storm patterns have been recorded in 15-min intervals since 1979. These data were used to develop intensity/duration/frequency (IDF) relationships for Los Alamos. These IDF curves were then used to establish individual 6-h design storm distributions for the 2-, 5-, 10-, 25-, 50-, and 100-yr events. A comparison with the SCS 6-h design storm distribution (SCS, 1968) shows that the SCS curve produces a slightly more uniform rainfall distribution and somewhat lower corresponding hydrograph peaks.

Since standard IDF curves had not been developed previously for Los Alamos, they were constructed for this study using precipitation data from Bowen (1990, p. 156). Intensity is the time rate of precipitation, expressed in inches per hour (in./h). Here, average intensity is given by the expression

$$i = P/T = c/(T^e + f), \qquad \text{(III-1)}$$

where i is average intensity (in./h) over time T; P is the precipitation depth (in.) listed in Bowen (1990); T is rainfall duration (min); and c, e, and f are coefficients that vary with location and return period (Tr). Plots of i versus T are shown in Fig. 2; for Los Alamos, these IDF curves have the following coefficients:

Tr (yr)	c	e	f
2	88.441	1.011	21.953
5	85.513	0.962	10.752
10	80.908	0.931	6.123
25	82.730	0.912	3.281
50	81.414	0.893	1.580
100	85.050	0.888	0.617

Once these IDF curves had been constructed, a hyetograph of a 6-h design storm was developed for each return-period event using the alternating-block method (Chow et al. 1988, pp. 454–466). Results for the 2- and 100-yr storm events are shown in Fig. 3. Figure 4 shows the cumulative 100-yr, 6-h design storm for Los Alamos and the SCS 6-h design storm for comparison. The Los Alamos cumulative 6-h design storm patterns for the 2-, 5-, 10-, 25-, 50-, and 100-yr events are listed in Table 2; note that these distributions are in dimensionless form. These hyetographs were used throughout this study in all HEC-1 simulations.

It should be noted that each of the Los Alamos storm distributions listed in Table 2 contains all of the shorter-duration events with the same recurrence interval. For example, the 100-yr, 6-h design storm contains the 100-yr, 15-min storm in its central 15-min interval. Likewise, the 100-yr, 30-min storm is contained within the central 30-min interval of the 100-yr, 6-h design distribution. Similar comments apply to the 2-, 5-, 10-, 25-, and 50-yr design storm events listed in Table 2.

While many theoretical storm distributions are available for midwestern and eastern watersheds, it was felt that none of these would adequately reflect conditions at Los Alamos. In other words, these

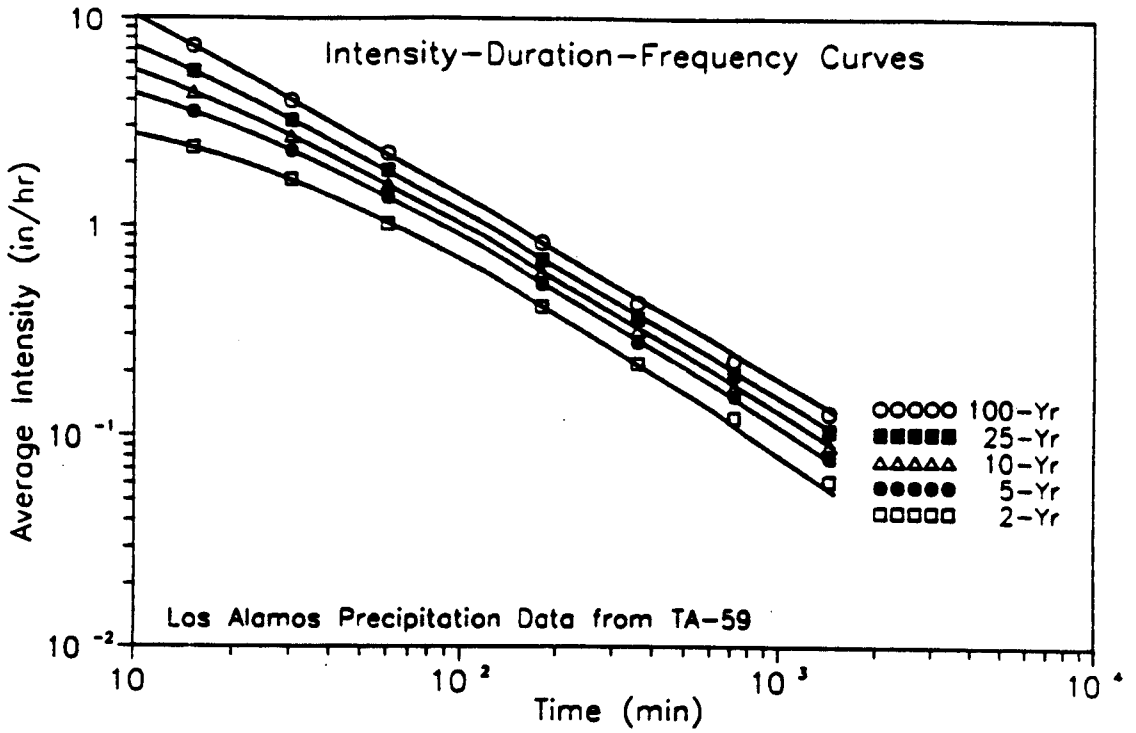


Fig. 2. Intensity-duration-frequency curves for Los Alamos County.

midwestern and eastern storm patterns tend to yield smaller peak hydrographs than those obtained from Los Alamos storm patterns. Note that one may also use instantaneous rainfall increments (Hoggan, 1989, p. 239; US Army COE, 1959; USBR, 1977, pp. 86–89) in HEC-1 simulations; however, this option was not used here. Instead, cumulative storm distribution patterns were used in all HEC-1 simulations; furthermore, they were adjusted for total rainfall depths in individual subbasin watersheds. It can be inferred from Fig. 3 that all of the 6-h design storm distribution patterns used in this study have a midpoint peak intensity near 3 h. Figure 3 also implies that gradually increasing and decreasing intensities precede and follow these peak values. This general worst-possible design storm pattern essentially satisfies abstractions with low rainfall intensity early in the storm. As a result, this design pattern yields higher hydrographs in response to higher rainfall intensities at later times. It should be added that observed New Mexico summer thunderstorms typically result from intense prefrontal squall lines moving south to north. While an observed 100-yr 6-h storm has never been recorded at Los Alamos, its characteristic distribution would probably show the highest rainfall intensities in the first hour and gradually decreasing rainfall intensities over the next 5 h. Furthermore, observed thunderstorms are exceptionally localized events and rarely cover an entire watershed. However, each subbasin's design storm was assumed to occur simultaneously with all other subbasin events in HEC-1 simulations. Hence, the Los Alamos design storm distribution patterns are conservative and tend to yield larger hydrograph peaks than would likely be obtained from observed hyetographs. Finally, it should be noted that observed rainfall data were obtained from Bowen (1989, Table 9.1) and are summarized here in Table 3. Linear interpolation was used to adjust these precipitation depth values for elevation differences between rain gages at Technical Areas 54 and 59 (TA-54 and TA-59) and individual elevations of subbasin centroids (Tables 4 and 5). Centroid elevations were obtained from 7.5-min-series USGS topographic maps. Precipitation depths listed in these tables were assumed to be uniformly distributed over their

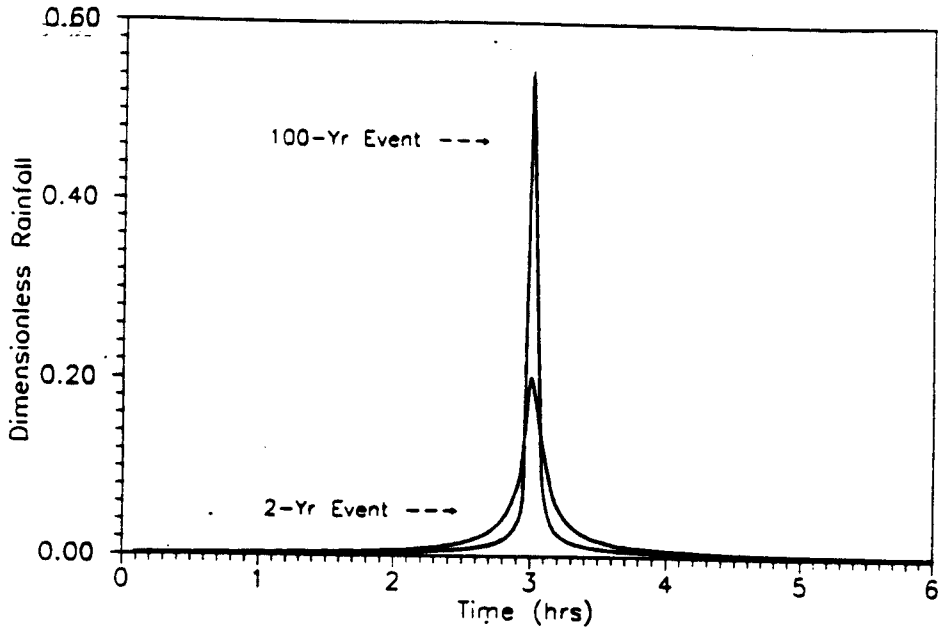


Fig. 3. Six-hour design storms for Los Alamos County.

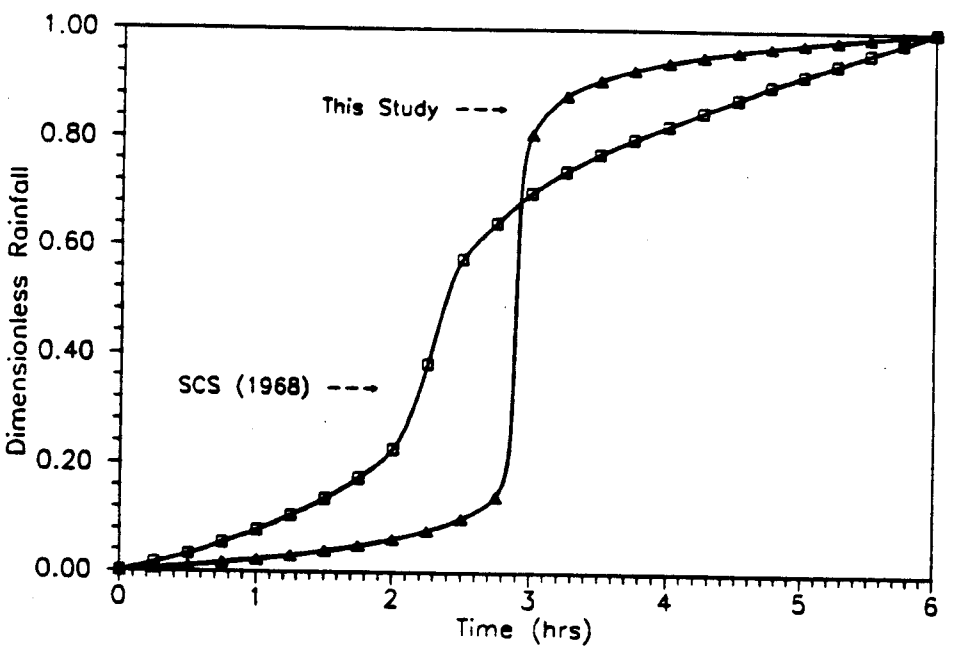


Fig. 4. Cumulative 100-yr. 6-h design storm distributions.

Table 2. Individual 6-hour design storm distributions for Los Alamos County. See Figures 1 through 3.

Time (min)	Time (hr)	Cumulative Storm Distribution (dimensionless) 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
0	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15	0.25	0.0021	0.0033	0.0041	0.0045	0.0051	0.0051
30	0.50	0.0046	0.0071	0.0087	0.0095	0.0106	0.0106
45	0.75	0.0078	0.0114	0.0139	0.0151	0.0167	0.0167
60	1.00	0.0118	0.0165	0.0199	0.0213	0.0235	0.0234
75	1.25	0.0169	0.0227	0.0268	0.0285	0.0312	0.0310
90	1.50	0.0238	0.0303	0.0351	0.0369	0.0401	0.0397
105	1.75	0.0334	0.0402	0.0454	0.0471	0.0507	0.0499
120	2.00	0.0476	0.0537	0.0588	0.0599	0.0637	0.0624
135	2.25	0.0704	0.0739	0.0778	0.0774	0.0808	0.0784
150	2.50	0.1125	0.1087	0.1088	0.1045	0.1060	0.1012
165	2.75	0.2121	0.1894	0.1770	0.1608	0.1542	0.1424
180	3.00	0.6644	0.7017	0.7289	0.7617	0.7833	0.8081
195	3.25	0.8493	0.8598	0.8637	0.8718	0.8726	0.8797
210	3.50	0.9113	0.9100	0.9070	0.9087	0.9057	0.9090
225	3.75	0.9416	0.9358	0.9307	0.9300	0.9260	0.9278
240	4.00	0.9594	0.9521	0.9465	0.9448	0.9408	0.9418
255	4.25	0.9709	0.9636	0.9581	0.9562	0.9525	0.9530
270	4.50	0.9790	0.9722	0.9673	0.9654	0.9622	0.9624
285	4.75	0.9849	0.9790	0.9749	0.9731	0.9704	0.9705
300	5.00	0.9894	0.9846	0.9813	0.9798	0.9776	0.9777
315	5.25	0.9930	0.9893	0.9868	0.9857	0.9841	0.9840
330	5.50	0.9958	0.9934	0.9917	0.9909	0.9899	0.9898
345	5.75	0.9981	0.9969	0.9961	0.9957	0.9951	0.9951
360	6.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

respective subbasins in all HEC-1 simulations. These depths were also assumed to have the temporal distributions listed in Table 2 using 15-min rainfall increments.

C. SCS Unit Hydrograph

Obviously, not all rainfall from a storm contributes to direct runoff, because some is lost during the overland flow process. Four theoretical rainfall-abstraction calculation techniques are incorporated in HEC-1; these include the initial and uniform, the exponential, the SCS, and the Holtan techniques. However, the SCS calculation method is the only one which provides reasonably good estimates when geographic watershed characteristics are used to estimate time-of-concentration or basin lag time values. Here, basin lag time is defined as the time between the centroid of excess rainfall and the resulting stream hydrograph peak. The SCS technique uses an SCS curve number (CN) to relate accumulated rainfall excess or runoff to accumulated rainfall with an empirical CN value. In equation form we have

$$R = (P-I)^2/(P-I+S),\ S = 1000/CN - 10,\ \text{and}\ I = 0.2S, \qquad \text{(III-2)}$$

where

Table 3. Precipitation depths for various return periods and storm durations at Los Alamos (TA-59) and White Rock (TA-54)

Los Alamos - TA-59: Elevation = 7379 ft above MSL.

Tr (yrs)	Precipitation Depth (inches)					
	1 hr	3 hr	6 hr	12 hr	24 hr	Annual
2	1.03	1.24	1.34	1.47	1.45	18.10
5	1.38	1.60	1.71	1.84	1.90	22.90
10	1.59	1.83	1.94	2.07	2.18	25.80
25	1.86	2.10	2.21	2.35	2.54	29.00
50	2.06	2.32	2.42	2.55	2.80	31.70
100	2.25	2.52	2.61	2.74	3.06	34.00
500	2.70	3.01	3.08	3.19	3.66	39.87

White Rock - TA-54: Elevation = 6690 ft above MSL.

Tr (yrs)	Precipitation Depth (inches)					
	1 hr	3 hr	6 hr	12 hr	24 hr	Annual
2	0.69	0.81	0.89	1.06	1.18	13.10
5	0.96	1.08	1.17	1.36	1.55	16.40
10	1.15	1.27	1.36	1.55	1.78	18.40
25	1.38	1.50	1.59	1.78	2.08	21.00
50	1.56	1.68	1.77	1.95	2.31	22.90
100	1.75	1.86	1.94	2.11	2.52	24.40
500	2.18	2.28	2.39	2.49	3.03	28.41

R = runoff (in.),
P = rainfall (in.),
I = infiltration abstraction (in.),
S = potential maximum retention after rainfall begins (in.), and
CN = SCS curve number (% of runoff).

The CN is a function of land use, vegetation cover, soil classification, hydrologic conditions, and antecedent moisture and runoff conditions. Variations in infiltration rates of different soil types are incorporated in the CN through the classification of soils into four hydrologic soil groups possessing high (Group A), moderate (Group B), low (Group C), and very low (Group D) infiltration capacities. Group A soils have a water transmission rate >0.30 in./h; Group B soils have a transmission rate of 0.15–0.30 in./h; Group C soils have a rate of 0.05–0.15 in./h; and Group D soils have a rate <0.05 in./h. These soil types have been previously mapped in Los Alamos County (Nyhan et al. 1978) and were used here. In addition, CN values have been tabulated in Hoggan (1989, pp. 33–36). Antecedent moisture conditions (AMC) that are typically used for design applications are called AMC-II (average AMC). Techniques for converting CN values under AMC-II to CN values under AMC-I (very dry soil, but above the average plant-wilting point) and AMC-III (nearly saturated soil—heavy rainfall or light ranifall with low temperatures has occurred within the previous five days) are available (Viessman et al. 1977, Tables 12–15, p. 622). However, no such adjustments

Table 4. Tabulated 2-year and 100-year, 6-hour precipitation totals for individual watershed sub-basins.

Watershed Name	Sub-Basin Centroid Elevation (ft MSL)	Precipitation (in) 2-year	100-year
Guaje			
1. Above BM-7172[1]	8100	1.69	3.29
2. Above BM-6253	6700	0.96	2.09
3. Rendija at BM-6253	7105	1.17	2.44
4. Above BM-5897 at Barrancas	6400	0.80	1.83
5. Above LA Canyon Confluence	5920	0.55	1.44
Barrancas			
1. Townsite Tributary at El 6000	6580	0.89	1.99
2. Southern Tributary at El 6000	6200	0.69	1.66
3. Northern 2 Tributaries El 5940	6600	0.90	2.00
4. Above BM-5897 at Guaje	6140	0.66	1.61
Baye			
1. Townsite Tributary at El 6615	7220	1.23	2.53
2. Main Channel at El 6080	6500	0.85	1.92
3. Southern Tributary at Totavi	6100	0.64	1.57
Pueblo			
1. Trib Confluence at El 7220	8400	1.84	3.54
2. Above County Line at El 6526	7300	1.27	2.60
3. NM-4 Y & LA Confluence	6480	0.84	1.90
Los Alamos			
1. Above Reservoir at El 7657	9200	2.26	4.23
2. Above Bridge at El 7126	7700	1.48	2.94
3. NM-4 Y & Pueblo Canyon	7050	1.14	2.39
4. Above Totavi at Baye Confluence	6000	0.59	1.49
5. Above Guaje Confluence	5740	0.45	1.29
6. Above Rio Grande Confluence	5600	0.38	1.18
Sandia			
1. Above NM-4 at El 6460	6900	1.06	2.26
2. Main Channel at El 6090	6400	0.80	1.83
3. Tsankawi Drainage at El 6090	6300	0.75	1.75
4. Above Rio Grande Confluence	5800	0.48	1.32
Mortandad			
1. Ten-Site Conflu at El 7060	7200	1.31	2.67
2. Above 1st Sed Trap at El 6783	7045	1.14	2.38
3. At East DOE Boundary Line	6730	0.97	2.11
4. Above NM-4 at El 6455 & Cedro	6640	0.92	2.04
5. Cedro Canyon at Mortandad	6650	0.93	2.05
6. Canada del Buey Confluence	6340	0.77	1.78
Canada del Buey			
1. Above NM-4 at White Rock[1]	6865	1.04	2.23
2. Above Rio Grande Confluence	6500	0.85	1.92
Pajarito			
1. Above NM-503 at W. DOE Line	8720	2.01	3.82
2. Above 2-mi Canyon Confluence	7500	1.37	2.77
3. 2-mi Canyon at Pajarito	7500	1.37	2.77
4. Above 3-mi Canyon Confluence	6850	1.03	2.22
5. 3-mi Canyon at Pajarito	7030	1.13	2.37
6. Above NM-4 & White Rock	6610	0.91	2.01
7. Above Rio Grande Confluence	6330	0.76	1.77
Potrillo			
1. Above Fence Confluence	6750	0.98	2.13
2. Fence Canyon at Potrillo	6700	0.96	2.09
3. Above Water Canyon Confluence	6400	0.80	1.83
Water			
1. Above NM-503 at West DOE Line	8400	1.84	3.54
2. Above Valle Canyon Confluence	7400	1.32	2.69
3. Above NM-4 at El 6410	6600	0.90	2.08
4. Above Potrillo C. Confluence	6500	0.85	1.92
5. Above Rio Grande Confluence	5700	0.43	1.23
Valle			
1. Above NM-503 at W. DOE Line	8680	1.99	3.78
2. Above TA-16 Area P Landfill	7510	1.38	2.78
3. Above Water Canyon Confluence	7300	1.27	2.60
Ancho			
1. West Fork and NM-4 at El 6246	6900	1.06	2.26
2. East Fork and NM-4 at El 6246	6800	1.01	2.17
3. Lower East Fork at El 5558	6400	0.80	1.83
4. Main Channel at El 5558	6300	0.75	1.75
5. Above Rio Grande Confluence	5750	0.46	1.28
Chaquehui			
1. Above Rio Grande Confluence	6450	0.82	1.87
Frijoles			
1. Main Channel at El 7200	8900	2.10	3.97
2. Below Burn Mesa at El 6670	7300	1.27	2.60
3. Above USGS Gage Station	7000	1.11	2.35

[1]Location of sub-basin outflow point in main stream channel; see watershed boundary and USGS 7.5 minute topographic maps.

Table 5. Tabulated 5, 10, 25, and 50-year, 6-hour precipitation totals for individual watershed sub-basins.

Watershed Name	6-hr Precipitation Totals (in) 5-yr	10-yr	25-yr	50-yr
Guaje				
1. Above BM-7172[1]	2.16	2.44	2.77	3.03
2. Above BM-6253	1.27	1.47	1.72	1.91
3. Rendija at BM-6253	1.53	1.75	2.02	2.23
4. Above BM-5897 at Barrancas	1.07	1.26	1.49	1.67
5. Above LA Canyon Confluence	0.77	0.92	1.13	1.29
Barrancas				
1. Townsite Tributary at El 6000	1.19	1.38	1.63	1.81
2. Southern Tributary at El 6000	0.95	1.12	1.34	1.51
3. Northern 2 Tributaries El 5940	1.20	1.40	1.64	1.83
4. Above BM-5897 at Guaje	0.91	1.08	1.29	1.46
Bayo				
1. Townsite Tributary at El 6615	1.60	1.83	2.11	2.32
2. Main Channel at El 6080	1.14	1.33	1.57	1.75
3. Southern Tributary at Totavi	0.88	1.05	1.26	1.43
Pueblo				
1. Trib Confluence at El 7220	2.35	2.65	3.00	3.27
2. Above County Line at El 6526	1.65	1.88	2.17	2.39
3. HW-4 Y & LA Confluence	1.13	1.31	1.55	1.73
Los Alamos				
1. Above Reservoir at El 7657	2.86	3.21	3.60	3.90
2. Above Bridge at El 7126	1.90	2.16	2.47	2.71
3. HW-4 Y & Pueblo Canyon	1.49	1.71	1.98	2.19
4. Above Totavi at Bayo Confluence	0.82	0.98	1.19	1.35
5. Above Guaje Confluence	0.65	0.80	0.99	1.14
6. Above Rio Grande Confluence	0.56	0.70	0.89	1.03
Sandia				
1. Above HW-4 at El 6460	1.39	1.61	1.87	2.07
2. Main Channel at El 6090	1.07	1.26	1.49	1.67
3. Tsankawi Drainage at El 6090	1.01	1.19	1.42	1.59
4. Above Rio Grande Confluence	0.69	0.84	1.04	1.19
Mortandad				
1. Ten-Site Conflu at El 7060	1.70	1.94	2.23	2.45
2. Above 1st Sed Trap at El 6783	1.49	1.71	1.98	2.18
3. At East DOE Boundary Line	1.30	1.49	1.74	1.93
4. Above HW-4 at El 6455 & Cedro	1.23	1.43	1.67	1.86
5. Cedro Canyon at Mortandad	1.23	1.43	1.68	1.87
6. Canada del Buey Confluence	1.04	1.22	1.45	1.62
Canada del Buey				
1. Above HW-4 at White Rock[1]	1.37	1.58	1.84	2.04
2. Above Rio Grande Confluence	1.14	1.33	1.57	1.75
Pajarito				
1. Above HW-503 at W. DOE Line	2.56	2.87	3.24	3.52
2. Above 2-mi Canyon Confluence	1.78	2.02	2.32	2.55
3. 2-mi Canyon at Pajarito	1.78	2.02	2.32	2.55
4. Above 3-mi Canyon Confluence	1.36	1.57	1.83	2.03
5. 3-mi Canyon at Pajarito	1.48	1.70	1.97	2.17
6. Above HW-4 & White Rock	1.21	1.40	1.65	1.84
7. Above Rio Grande Confluence	1.03	1.21	1.44	1.61
Potrillo				
1. Above Fence Confluence	1.30	1.50	1.76	1.95
2. Fence Canyon at Potrillo	1.27	1.47	1.72	1.91
3. Above Water Canyon Confluence	1.07	1.26	1.49	1.67
Water				
1. Above HW-503 at West DOE Line	2.35	2.65	3.00	3.27
2. Above Valle Canyon Confluence	1.71	1.95	2.25	2.47
3. Above HW-4 at El 6410	1.20	1.40	1.64	1.83
4. Above Potrillo C. Confluence	1.14	1.33	1.57	1.75
5. Above Rio Grande Confluence	0.63	0.77	0.96	1.11
Valle				
1. Above HW-503 at W. DOE Line	2.53	2.85	3.21	3.49
2. Above TA-16 Area P Landfill	1.78	2.03	2.33	2.55
3. Above Water Canyon Confluence	1.65	1.88	2.17	2.39
Ancho				
1. West Fork and HW-4 at El 6246	1.39	1.61	1.87	2.07
2. East Fork and HW-4 at El 6246	1.33	1.54	1.79	1.99
3. Lower East Fork at El 5558	1.07	1.26	1.49	1.67
4. Main Channel at El 5558	1.01	1.19	1.42	1.59
5. Above Rio Grande Confluence	0.66	0.81	1.00	1.15
Chaquehui				
1. Above Rio Grande Confluence	1.11	1.29	1.53	1.71
Frijoles				
1. Main Channel at El 7200	2.67	3.00	3.38	3.66
2. Below Burn Mesa at El 6670	1.65	1.88	2.17	2.39
3. Above USGS Gage Station	1.46	1.68	1.94	2.15

[1]Location of sub-basin outflow point in main stream channel; see watershed boundary and USGS 7.5 minute topographic maps.

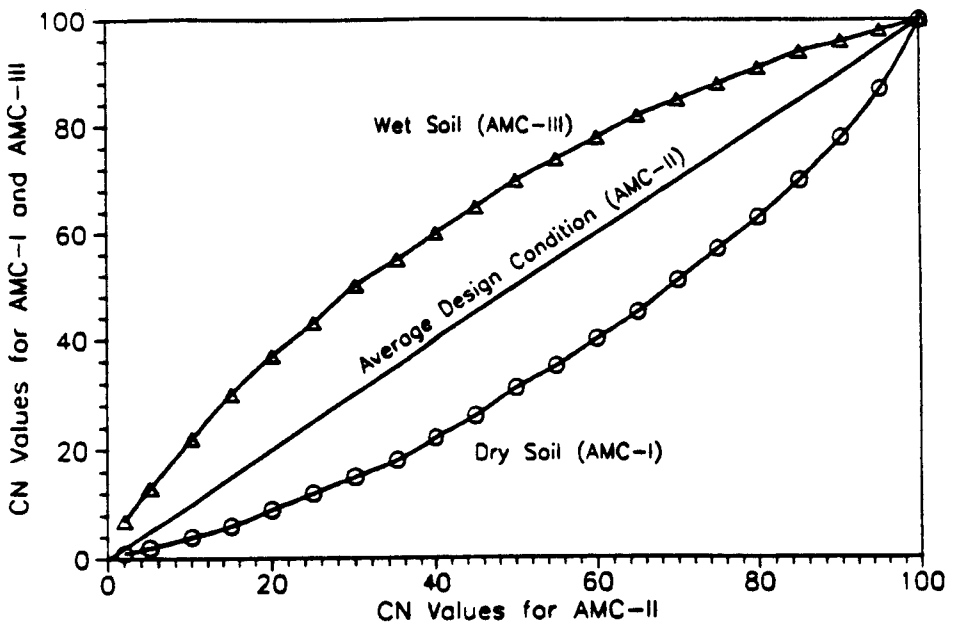


Fig. 5. Variations of SCS curve numbers for different moisture conditions.

were made in this study. Figure 5 shows the relationship of CN values under AMC-I and AMC-III conditions as a function of CN values under AMC-II conditions. Once rainfall excess has been determined, a unit hydrograph can be computed for each subbasin.

The SCS synthetic unit hydrograph procedure is based on a dimensionless unit hydrograph developed from an analysis of numerous unit hydrographs from small geographically diverse, rural watersheds. This dimensionless unit hydrograph represents the ratio of discharge to peak discharge versus the ratio of time to lag time. This lag time is a fundamental watershed characteristic and directly depends upon overland flow path length and mean flow velocity. As such, lag time is influenced by drainage basin area, main channel slope and geometry, land cover, and temporal and spatial storm patterns. In concept, the lag time incorporates the effect of basin size and much of the effect of basin shape. The advantage of the SCS approach is that it only requires the determination of time-to-peak (t_p) and peak discharge (Q_p), which are given by (Viessman et al. 1977, pp. 138–139)

$$t_p = D/2 + t_l \text{ and } Q_p = 454\ A/t_p, \tag{III-3}$$

where

t_p = time from rainfall beginning to peak discharge (h),
D = rainfall duration (h),
t_l = basin lag time from centroid of rainfall excess to peak discharge (h),
Q_p = peak discharge (cfs),
A = watershed drainage area (sq mi).

The basin lag time (t_l) in Equation (III-3) can be expressed as

$$t_l = [l^{0.8}\ (S + 1)^{0.7}]/[1900\ Y^{0.5}], \tag{III-4}$$

where l is the water course length (ft) going upstream to the watershed divide, Y is the average watershed slope (%) along the flow path, and all other terms are as previously defined.

Figure 6 uses Equation (III-4) and the tabulated data contained in Appendix B to depict basin lag time as a function of subbasin drainage area for Los Alamos. According to Graf (1988, p. 90), these lag times are comparable to those from northeastern US watersheds. However, he does not indicate how his values were determined. In Fig. 7 Los Alamos watershed data are used to show SCS basin lag times from Equation (III-4) as a function of Snyder basin lag times. Data used to compute these Snyder lag times are summarized in Table 6. The upper curve in Fig. 7 was obtained from a relationship derived by the US Army COE for mountainous watersheds near Los Angeles, California (Linsley et al. 1982, pp. 223-225). This relationship is given by

$$t_{sl} = C_t[(L \cdot Lc)/(s^{0.5})]^n, \qquad \text{(III-5)}$$

where

t_{sl}	=	Snyder lag time (h) for mountainous watersheds,
C_t	=	coefficient accounting for slope and storage effects,
L	=	channel length (mi) from basin outlet to divide,
Lc	=	channel length (mi) from basin outlet to centroid,
s	=	weighted channel slope (ft/ft), and
n	=	an empirical coefficient.

For mountainous watersheds near Los Angeles, California, Linsley reports values for C_t and n of 1.2 and 0.38, respectively. The lower curve in Fig. 7 represents Snyder lag times based on the US Army COE's studies from the Rio Puerco, in New Mexico, and from El Paso, Texas. For this second curve, the standard Snyder lag time equation was used. This expression is given by

$$t_{sl} = C_t(L \cdot Lc)^{0.30}, \qquad \text{(III-6)}$$

where all terms are as previously defined. Values for C_t were obtained from a logarithmic plot of C_t verses s (M. Magnuson, personal communication 1989). Figure 7 clearly shows that the SCS basin lag times used in this study are bracketed by extremes produced with the Snyder technique.

As mentioned above, the SCS runoff CN relates accumulated rainfall excess or runoff to accumulated rainfall. In addition to ease of use, Equation (III-4) has the advantage that the impacts of development within a watershed can be evaluated because changes in CN over time are easily estimated. As previously mentioned, tables exist that list CN values for a variety of conditions, ranging from urban to semiarid (Hoggan 1989, pp. 33-36). These same impacts cannot be estimated with the Snyder or Clark methods. In fact, if one originally employed either the Snyder or the Clark unit hydrograph method and land use patterns changed over time, there would be no systematic methodology for evaluating corresponding changes in the hydrograph peak, unless the SCS technique was subsequently used.

The US Army COE in Albuquerque has developed Snyder's synthetic unit hydrograph method for applications in north central New Mexico (M. Magnuson, personal communication, 1989). Regardless, it was felt that the Snyder's coefficients representing basin slopes and storage were generally not applicable to Pajarito Plateau. It can be inferred from Fig. 7 that either smaller or larger hydrograph peaks can be obtained from HEC-1 simulations if the Snyder unit hydrograph approach is used instead of the SCS technique. The potential for generating larger hydrograph peaks is obviously of interest. However, as discussed in Subsection E, use of this alternative approach in Los Alamos County cannot be justified.

D. Model Input Parameters

Because all watersheds within the DOE-LANL complex are similar, individual HEC-1 input data files have a similar structure (see Disk No. 1). This generic file structure is illustrated in Table 7. Individual watershed boundary location maps were constructed from 7.5-min USGS topographic

Table 6. Parameters used to compute Snyder basin lag times using equations (III-5 and 6). See Figure 6 and text for definitions.

Watershed Sub-Basin	Area (sq mi)	L (mi)	Lc (mi)	E-85 (ft)	E-10 (ft)	Slope (%)	Ct
Guaje[1]							
1	11.30	6.44	2.41	8840	7300	6.84[2]	0.54
2	3.25	4.55	3.49	7020	6340	3.78	0.62
3	9.59	8.71	4.83	7860	6400	4.23	0.60
4	2.13	2.41	1.61	6168	5900	2.80	0.68
5	1.45	1.70	0.99	5845	5675	2.52	0.66
Barrancas							
1	1.79	4.83	2.37	6880	6120	3.97	0.61
2	0.33	1.37	0.52	6385	6020	6.71	0.52
3	2.52	4.36	2.41	6840	6020	4.75	0.58
4	0.21	0.62	0.47	5960	5880	3.28	0.69
Bayo							
1	1.57	3.17	1.66	7150	6670	3.82	0.48
2	1.14	2.89	1.28	6560	6150	3.38	0.49
3	1.19	2.41	1.23	6220	5820	4.10	0.50
Pueblo							
1	2.24	2.84	1.56	7820	7260	4.90	0.57
2	4.61	4.55	3.17	7130	6652	2.66	0.72
3	1.55	2.65	1.56	6420	6295	1.19	0.94
Los Alamos							
1	6.33	3.79	2.18	8900	7740	7.73	0.50
2	0.74	1.89	0.95	7520	7160	4.80	0.58
3	3.31	6.63	3.50	6980	6350	2.40	0.74
4	1.96	2.23	0.99	6170	5775	4.40	0.59
5	0.77	0.95	0.52	5740	5670	1.87	0.77
6	0.67	1.47	0.99	5630	5500	2.24	0.73
Sandia							
1	2.65	6.96	3.22	7250	6530	2.61	0.72
2	0.85	2.23	1.18	6420	6240	2.04	0.76
3	1.32	1.89	1.18	6360	6160	2.67	0.72
4	0.75	1.70	1.04	5780	5510	4.00	0.61
Mortandad							
1	0.55	1.70	0.76	7360	7115	3.63	0.63
2	0.81	1.99	1.04	7020	6800	2.79	0.68
3	0.36	1.14	0.57	6765	6670	2.11	0.73
4	1.61	2.32	1.89	6630	6470	1.74	0.79
5	0.86	3.03	1.85	6760	6480	2.33	0.74
6	1.72	2.56	1.33	6425	5720	6.96	0.52
Canada del Buey[1]							
1	2.10	5.59	2.94	6980	6480	2.26[2]	0.74
2	2.42	2.79	2.79	6360	5510	7.68	0.50
Pajarito							
1	1.99	3.27	1.61	9915	7950	18.19	0.42
2	2.57	3.46	2.60	7570	6980	4.31	0.60
3	3.28	5.35	2.56	8440	6990	6.84	0.52
4	0.67	2.08	1.04	6910	6745	2.00	0.76
5	1.70	3.69	1.70	7280	6752	3.61	0.68
6	1.15	2.84	1.42	6700	6530	1.51	0.83
7	2.24	2.94	1.47	6460	5540	7.91	0.50
Potrillo							
1	2.78	5.40	2.79	7020	6460	2.62	0.70
2	1.03	3.41	2.04	6860	6490	2.74	0.69
3	0.96	1.85	0.90	6410	5880	7.25	0.51
Water							
1	4.07	3.41	1.75	9100	7605	11.07	0.46
2	2.63	3.36	1.75	7400	6880	3.91	0.61
3	1.42	3.60	1.85	6750	6450	2.11	0.73
4	1.97	2.60	1.28	6340	5880	4.46	0.59
5	0.32	0.95	0.57	5770	5400	9.87	0.47
Valle							
1	2.33	4.26	2.46	9480	7840	9.72	0.47
2	0.78	1.42	0.90	7600	7320	4.98	0.57
3	1.17	2.37	1.61	7225	6880	3.68	0.63
Ancho							
1	2.19	4.88	2.60	7060	6275	4.06	0.50
2	2.48	4.17	2.08	6860	6290	3.48	0.52
3	1.11	2.46	1.33	6450	5810	6.56	0.44
4	1.04	1.89	0.95	6210	5670	7.28	0.51
5	0.19	0.47	0.47	5530	5410	6.40	0.54
Chaquehui							
1	1.50	3.13	1.56	6540	5650	7.19	0.51
Frijoles							
1	4.97	3.83	1.89	9500	7860	10.83	0.46
2	4.92	4.62	2.46	7560	6780	4.26	0.60
3	8.13	4.55	4.17	6520	6090	2.39	0.72

[1]See Table 4 for locations of sub-basin outflow points.
[2]Weighted sub-basin slope = (E85 - E10)*100/(0.75*L).

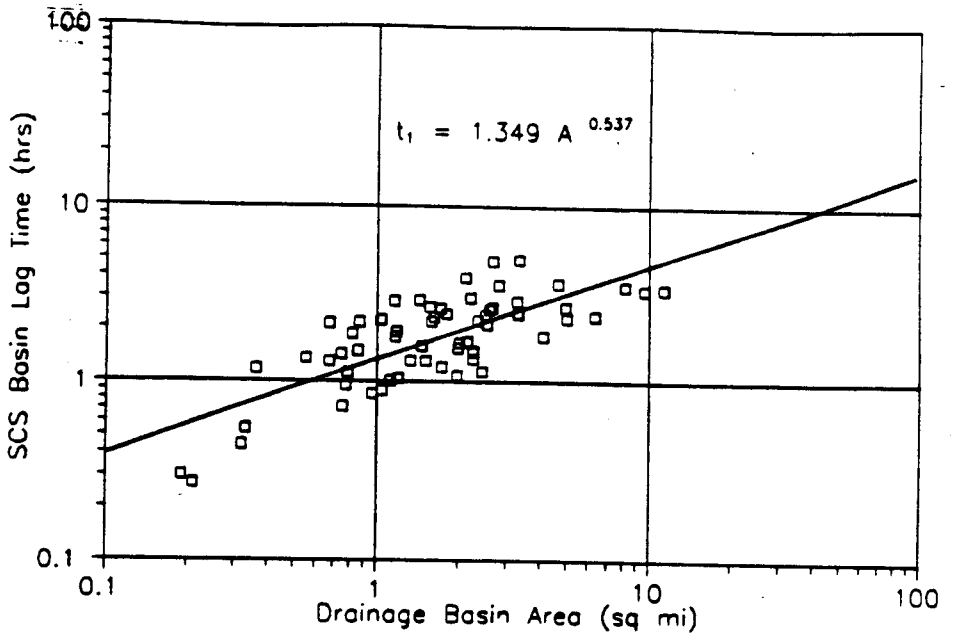


Fig. 6. Drainage basin area vs SCS basin lag time at Los Alamos.

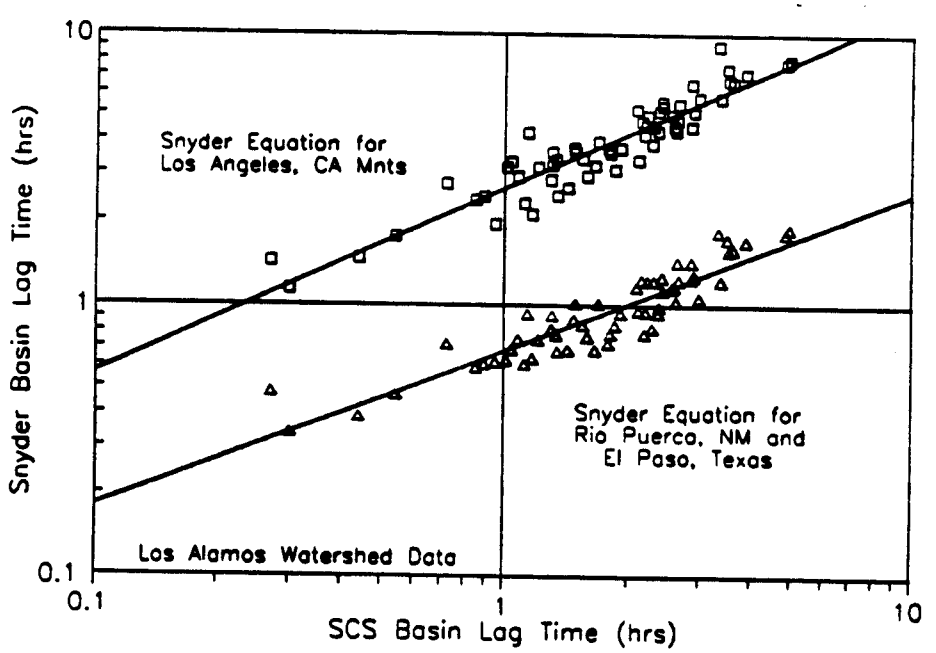


Fig. 7. SCS basin lag time vs Snyder lag times at Los Alamos.

Table 7. Typical HEC-1 input file identification scheme. See HEC-1 user manual for complete listing of other options.

Data Category	Record Identification	Data Description
Job Initialization	ID	Job Identification
	IT	Job Time Control
	IO	General Output Control
	IN	Input Data Time Control
Precipitation Data	PC[1]	Cumulative Prec Time Series
	PG[2]	Storm Gage Total Precipitation
	PR	Recording Gage to be Weighted
	PW	Precipitation Gage Weight Factor
	PT	Total Storm Gages to be Weighted
Job Step Control	KK	Stream Station Identifier
	KM	Alphanumeric Comment Message
	KO	Output Control for this Station
Basin Data	BA[3]	Basin Area
Loss Rate Data	LS[3]	SCS Curve Number Loss Technique
Unitgraph Data	UD[3]	SCS Dimensionless Unitgraph
Routing Data	RL	Channel Loss Rates
	RM[3]	Muskingum Routing Parameters
Hydrograph Transformations	HC	Combine Hydrographs
End of Job	ZZ	Required to End Job

[1]See Table 2 for design storm distribution.

[2]See Tables 4 and 5 for individual sub-basin values.

[3]See individual watershed sub-basin values in Appendix A.

maps; they are located with the floodplain boundary maps in the Facilities Engineering Planning Group Office (Comer and McLin 1991). Equations to compute individual input file parameters were listed in the previous section. Results of these calculations are listed in Appendix B. Tabulated watershed characteristics include subbasin area, subbasin main channel length to water divide or upstream subbasin boundary, elevation change over channel length, average subbasin CN value, and computed SCS basin lag time from Equation (III-4). All watersheds were outlined on the USGS topographic maps, and individual subbasin areas were measured with a planimeter. Measurements obtained from four repeated area calculations for each subbasin yielded variances that deviated <1% from average values. Selected watershed areas are listed in Table 8, and all subbasin area mean values are given in Appendix B and Disk No. 1. Channel lengths and elevation changes were also taken directly from topographic maps with similar measurement repeatability. It should also be mentioned that predicted HEC-1 hydrographs are relatively insensitive to minor measurement

Table 8a. Hydrograph peaks (cfs) corresponding to individual 6-hour Los Alamos design storm events at east DOE-LANL boundary. See Table 9 for description of exact locations. See Table 2 for cumulative storm distribution patterns.

Watershed Name	Basin Area	Recurrence Interval Hydrograph Peaks (cfs) 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Guaje[1]	26.27[2]	20	137	265	472	666	888
Barrancas	2.12	1	12	25	47	67	90
Bayo	3.92	2	21	43	79	111	147
Pueblo	8.40	8	65	121	211	292	383
Los Alamos	10.38	19	115	204	332	447	589
Los Alamos	20.74	24	166	300	502	686	902
Sandia	2.65	1	10	21	38	54	71
Mortandad	1.72	1	6	11	19	27	35
Canada del Buey	2.10	1	11	21	38	54	72
Pajarito	11.36	5	71	143	263	372	498
2-Mile	3.28	1	19	40	77	111	149
3-Mile	1.70	1	12	24	43	60	80
Fence	1.03	1	8	16	29	41	55
Potrillo	2.78	1	14	28	53	75	99
Potrillo	4.77	2	15	30	56	81	108
Canon de Valle	4.28	2	21	41	75	104	141
Water	12.40	4	68	139	255	361	485
Ancho	4.67	2	27	57	105	150	198
Chaquehui	1.50	1	13	27	53	78	103
Frijoles[1]	18.02	33	160	284	479	654	853

[1]Watershed boundary is outside DOE-LANL complex.
[2]Drainage basin area in square miles.

Table 8b. Total 24-hr runoff volumes (ac-ft) corresponding to individual 6-hour Los Alamos design storm events at east DOE-LANL boundary. See Table 9 for description of exact locations. See Table 2 for cumulative storm distribution patterns.

Watershed Name	Basin Area	Recurrence Interval 24-hr Runoff (ac-ft) 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Guaje[1]	26.27[2]	8	67	133	236	333	442
Barrancas	2.12	<1	4	8	18	24	32
Bayo	3.92	<1	8	16	30	44	58
Pueblo	8.40	4	26	48	85	119	155
Los Alamos	10.38	8	48	83	137	184	240
Los Alamos	20.74	12	75	141	236	325	424
Sandia	2.65	<1	6	12	22	32	42
Mortandad	1.72	<1	1	2	4	6	9
Canada del Buey	2.10	<1	6	10	18	24	30
Pajarito	11.36	2	26	54	99	141	186
2-Mile	3.28	<1	6	14	26	38	50
3-Mile	1.70	<1	4	8	16	22	28
Fence	1.03	<1	2	4	10	12	16
Potrillo	2.78	<1	6	12	24	34	44
Potrillo	4.77	<1	8	18	32	46	60
Canon de Valle	4.28	<1	6	10	18	26	38
Water	12.40	2	24	48	87	125	169
Ancho	4.67	<1	10	20	38	54	71
Chaquehui	1.50	<1	2	6	12	16	22
Frijoles[1]	18.02	12	65	119	200	276	359

[1]Watershed boundary is outside DOE-LANL complex.
[2]Drainage basin area in square miles.

errors in subbasin area, main channel length, and elevation differences as implied by Equation (III-4). In addition, Manning's equation was used to compute Muskingum routing parameters from average channel flow velocities (Appendix B). Finally, it should be pointed out that all watershed parameters are listed in the HEC-1 input data files on Disk No. 1 and are not discussed in detail here.

Note that Guaje and Frijoles Canyons have been included in Tables 4 and 5, Appendix B, and on Disk-No. 1 even though these watershed stream channels do not cross the DOE-LANL complex. Guaje Canyon was included because the Guaje municipal well field is located there; Frijoles Canyon was included because a USGS gaging station is located at the Bandelier National Park Headquarters. Also note that the tabulated watershed characteristics are listed according to subbasins within a given watershed. Each subbasin boundary division was selected according to several factors. These included (1) tributary inflow, (2) significant change in CN value, (3) an important geographic feature or manmade boundary marker, or (4) another unspecified feature for which a hydrograph peak value was required in HEC-2 simulations. Finally, it should be noted that these subbasins extend from the topographic peaks that define watershed boundaries located to the west of the DOE-LANL complex to the Rio Grande drainage confluence located to the east. Hence, hydrograph peak values were obtained for numerous points along individual watercourses within the DOE-LANL complex, for individual stream channels as they exit the DOE-LANL complex, and for confluent channels merging with the Rio Grande. Only 100-yr floodplains within the DOE-LANL complex were computed, however, because the AUTOGIS-MOSS topographic data do not extend beyond this boundary.

E. Peak Hydrographs for Major Watersheds

Once all subbasin characteristic parameters (Appendix B) and HEC-1 input data files (Disk No. 1) had been prepared, individual watershed hydrographs could be generated. Before this was done, however, a parameter sensitivity analysis was made. With the approach that was used here, all model parameters, except for composite subbasin CNs, are constrained to a very narrow range of observed values. These CN values could be estimated from county soil maps (Nyhan et al. 1978) and standard tables (Hoggan 1989). In actual practice, an individual, composite, subbasin CN value was computed as an area-weighted average according to mapped soil and vegetation types and variable CN values. However, it is reasonable to expect that composite CN values can vary by as much as 10% above or below their originally estimated values. Hence, in order to reduce the uncertainty in these estimated CN values, hydrograph peaks produced by the 2-yr, 6-h design storm event for LANL were examined for all subbasin watersheds. The logic for this design procedure is straightforward: from physical observation, one can quickly develop a general appreciation for flood magnitudes associated with individual 2-yr storm events within Los Alamos County. These qualitative observations suggest that 2-yr flood peaks in Los Alamos County vary between zero and a few hundred gallons per minute. This same appreciation cannot be easily developed for 100-yr magnitude events. Following this logic, all HEC-1 simulations should accurately reflect 2-yr events if one is to have confidence in larger recurrence-interval floods. Note that once all subbasin characteristic parameters have been determined for a given HEC-1 watershed, changing the subbasin rainfall totals (i.e., the PG data card shown in Table 7 for each HEC-1 input data file) and the design storm distribution patterns (i.e., the PC cards shown in Table 7) generates different recurrence interval hydrographs. Results obtained from this design methodology are outlined below.

Each HEC-1 watershed simulation was made for the 2-yr, 6-h LANL design storm event, as described above. If a given subbasin yielded a hydrograph peak that was unreasonably high or low, then the composite CN value was adjusted either downward or upward, respectively, and a new simulation was made. Note that a change in CN value implies a corresponding change in basin lag time, as suggested by Equation (III-4). This iterative process was repeated several times for each watershed. Individual composite CN values were typically adjusted <3% until the 2-yr hydrograph peak was greater than zero but less than about 2 cfs for an average-sized subbasin. Approximately half of all subbasins required a composite CN value adjustment; these adjustments were nearly

equally divided between increases and decreases in CN values. Once these CN values were fixed, the 2-, 5-, 10-, 25-, 50-, and 100-yr hydrographs were computed using the 6-h rainfall totals listed in Tables 4 and 5 and the design storm distribution patterns listed in Table 2. Resulting hydrograph peaks and 24-h runoff volumes for all watersheds crossing the eastern DOE-LANL boundary are given in Tables 8 and 9. Table 10 lists hydrograph peaks and 24-h runoff volumes for confluent stream channels at the Rio Grande. One should use care in referring to these tables. For example, the Los Alamos Canyon watershed is listed in both tables. In Table 8, the second Los Alamos hydrograph peak includes Pueblo Canyon flows because these streams are confluent above the eastern DOE-LANL boundary. In Table 10, the Los Alamos values include flows from Guaje, Rendija, Barrancas, Bayo, Pueblo, and Los Alamos Canyons because all of these streams are confluent above the Rio Grande. Similar comments apply to other listed watersheds. It should also be mentioned that these combined hydrograph peaks cannot simply be arithmetically added together. Instead they must be hydraulically routed downstream and then combined. In other words, each stream hydrograph abscissa must be aligned to account for flood wave travel time. This procedure is automatically performed in the HEC-1 hydrograph-combining subroutine. Finally, it should be pointed out that all stream channels were assumed to have zero baseflow because all streams within the DOE-LANL boundary are normally ephemeral.

F. Comparison with USGS Flood-Flow Frequencies

The USGS has developed regression equations (Waltemeyer 1986) for estimating flood discharges for the 2-, 5-, 10-, 25-, 50-, and 100-yr recurrence intervals from ungaged watersheds in New Mexico. A comparison between hydrograph peaks produced by the HEC-1 and USGS techniques was made in order to illustrate their differences. Generally, one might expect both methods to yield 100-yr peak flows of similar magnitude for Pajarito Plateau watersheds. However, the USGS approach consistently yields higher peak flows than does the HEC-1 technique employed above. At lower recurrence intervals, these differences become more pronounced. For 2-yr floods, the USGS procedure yields hydrograph peaks that are typically one or more orders of magnitude larger than HEC-1 peaks using equivalent subbasin watershed parameters. The reason for these differences is centered on the storm pattern incorporated into each technique and the fact that the HEC-1 model theoretically simulates the rainfall-runoff process more realistically.

Los Alamos County is located within the Central Mountain-Valley Region, according to Waltemeyer (1986, pp. 3 and 47). His regression equation for hydrograph peaks is given by

$$Q_n = (aA^b)(Ec/1000)^c(I^d), \qquad \text{(III-7)}$$

where

Q_n	=	hydrograph peak (cfs) for yearly recurrence interval n,
A	=	watershed area (sq mi),
Ec	=	average channel elevation at points that are 10% and 85% of the stream length upstream from the hydrograph peak (ft), and
I	=	rainfall total (in.) for the 10-yr, 24-h storm.

In Equation (III-7), parameters a, b, c, and d are the regression coefficients. For Los Alamos, these parameters are listed below.

Table 9. Channel locations of hydrograph peaks listed in Table 8; also see USGS 7.5 minute topographic maps.

Watershed Name	Stream-channel locations of hydrograph peaks
Guaje[1]	Above Barrancas Canyon confluence.
Barrancas	Tributary confluence below east DOE-LANL boundary.
Bayo	Tributary confluence above east DOE-LANL boundary.
Pueblo	Above Los Alamos Canyon confluence at HW-4.
Los Alamos	Above Pueblo Canyon confluence at HW-4.
Los Alamos	Above Bayo Canyon confluence at Totavi.
Sandia	At DOE-LANL eastern boundary.
Mortandad	At DOE-LANL eastern boundary.
Canada del Buey	At DOE-LANL eastern boundary.
Pajarito	At DOE-LANL eastern boundary.
2-Mile	Above Pajarito Canyon confluence.
3-Mile	Above Pajarito Canyon confluence.
Fence	Above Potrillo Canyon confluence at gravel pit.
Potrillo	Above Fence Canyon confluence.
Potrillo	Above Water Canyon confluence.
Canon de Valle	Above Water Canyon confluence.
Water	Stream crossing at HW-4.
Ancho	Stream confluence below HW-4.
Chaquehui	At DOE-LANL eastern boundary.
Frijoles[1]	At USGS gaging station above Rio Grande.

[1]Watershed boundary is outside DOE-LANL complex.

Table 10a Hydrograph peaks (cfs) corresponding to individual 6-hour Los Alamos design storm events at the Rio Grande confluence. See Table 2 for cumulative storm distribution patterns.

Watershed Name	Basin[1] Area	Recurrence Interval Hydrograph Peaks (cfs) 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Los Alamos	58.67	39	302	573	997	1392	1845
Sandia	5.57	2	23	50	96	137	182
Canada del Buey	10.43	33	74	127	220	300	395
Pajarito	13.60	24	71	142	260	369	495
Water	19.46	5	80	165	305	434	580
Ancho	7.01	2	32	67	124	179	236
Chaquehui	1.50	1	13	27	53	78	103
Frijoles[2]	18.02	33	160	284	479	654	853

[1]Drainage basin area in square miles.

[2]At USGS gaging station above Rio Grande confluence.

Table 10b Total 24-hr runoff volumes (ac-ft) corresponding to individual 6-hour Los Alamos design storm events at the Rio Grande confluence. See Table 2 for cumulative storm distribution patterns.

Watershed Name	Basin[1] Area	Recurrence Interval 24-hr Runoff (ac-ft) 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Los Alamos	58.67	22	161	309	543	764	1010
Sandia	5.57	<1	10	24	44	61	81
Canada del Buey	10.43	6	24	44	75	103	135
Pajarito	13.60	6	36	67	121	169	222
Water	19.46	2	36	71	135	190	258
Ancho	7.01	1	14	30	54	77	103
Chaquehui	1.50	<1	2	6	12	16	22
Frijoles[2]	18.02	12	65	119	200	276	359

[1]Drainage basin area in square miles.

[2]At USGS gaging station above Rio Grande confluence.

Q_n	a	b	c	d
2	55200	0.17	−1.05	1.79
5	170000	0.41	−1.13	1.67
10	289000	0.42	−4.11	1.59
25	497000	0.40	−4.13	1.51
50	685000	0.39	−4.11	1.45
100	896000	0.38	−4.09	1.40

All other parameters for Equation (III-7) are listed in Table 11 for watersheds draining the eastern DOE-LANL facility boundary. Note that Waltemeyer (1986, p. 6) indicates that I is the maximum precipitation intensity for the 10-yr, 24-h storm event. He indicates that these I-values can be obtained from precipitation-frequency maps for New Mexico (Miller et al. 1973). However, these maps give precipitation totals rather than intensity, which is given in inches per hour. Thus, the 10-yr, 24-h precipitation total is listed in Table 11. Comparison of 2- and 100-yr hydrograph peaks, as a function of drainage basin area are shown in Figs. 8 and 9. The USGS and HEC-1 methods were used for Los Alamos County. Obviously, for Pajarito Plateau watersheds the USGS approach consistently yields larger hydrograph peaks than does the HEC-1 model. The 2-yr floods obtained from the USGS method are especially interesting because they are so large. In fact, it is this obvious discrepancy that prompted the use of the HEC-1 approach in the first place. Any long-term county resident will readily agree that the predicted 2-yr USGS hydrograph peak flows grossly disagree with his or her personal experience. By logical extension, one must also question the 100-yr flood peaks. For this reason the USGS approach was rejected for use on Pajarito Plateau watersheds. One should not infer that other New Mexico watersheds outside Los Alamos County cannot be accurately represented with the USGS technique, however.

Figures 8–10 depict the HEC-1 hydrograph peaks at the eastern DOE-LANL boundary and at the Rio Grande. These peaks are also listed in Tables 8–10. These and other peak values were used as input data in HEC-2 simulations for final definition of all 100-yr floodplains. Figure 11 shows 100-yr peak flows along the Los Alamos Canyon watershed and includes data from Los Alamos, Guaje, Rendija, Barrancas, Bayo, and Pueblo canyons.

G. Comparison with Other Flood-Flow Frequencies

Lane et al. (1985, pp. 30–37) have generated synthetic streamflow and sediment transport data for Los Alamos Canyon above the Rio Grande confluence. Many of these data were previously unpublished but have recently been reported by Graf (1991, Appendix B4). These data are summarized in Table 12. Weibull plotting positions were used to conduct a log-Pearson Type-III analysis (WRC 1967, WRC 1981, US Army COE 1982) for these data. Figure 12 clearly shows that Lane's synthetic streamflow data are statistically identical to HEC-1 hydrograph peaks obtained in this study for Los Alamos Canyon at the Rio Grande.

IV. HEC-2 WATER-SURFACE PROFILES

A. General Model Description

The HEC-2 model is similar in concept to the HEC-1 model in that it contains a calling program and multiple subroutines. The HEC-2 calculates and plots water-surface profiles for subcritical, critical, and supercritical gradually varied steady flows in channels of any cross-sectional configuration. The principal uses of the model are for floodplain definition; for evaluation of the hydraulic effects of bridges, culverts, and weirs; and for calculating stream profiles for various frequency floods for both

Table 11. Watershed parameters for estimating hydrograph peaks at east DOE-LANL boundary using equation (III-7). See Table 9 for basin locations. See text for discussion.

Watershed Name	Basin Area	E85 (ft)	E10 (ft)	Ec (ft)	I (in)
Guaje[1]	26.27[2]	8480	6060	7270	2.12
Barrancas	2.12	6880	6120	6500	1.67
Bayo	3.92	7035	6220	6628	1.74
Pueblo	8.40	7900	6395	7148	2.05
Los Alamos	10.38	8235	6415	7325	2.15
Sandia	2.65	7250	6530	6890	1.86
Mortandad	1.72	7235	6710	6973	1.94
Canada del Buey	2.10	6980	6480	6730	1.80
Pajarito	11.36	8560	6590	7575	2.29
Potrillo	4.77	6470	6050	6260	1.53
Canon de Valle	4.28	9100	7000	8050	2.57
Water	19.46	8155	5960	7058	1.99
Ancho	7.01	6960	5685	6323	1.57
Chaquehui	1.50	6540	5640	6090	1.43
Frijoles[1]	18.02	8790	6185	7488	2.24

[1]Watershed boundary is outside DOE-LANL complex.

[2]Drainage basin area in square miles.

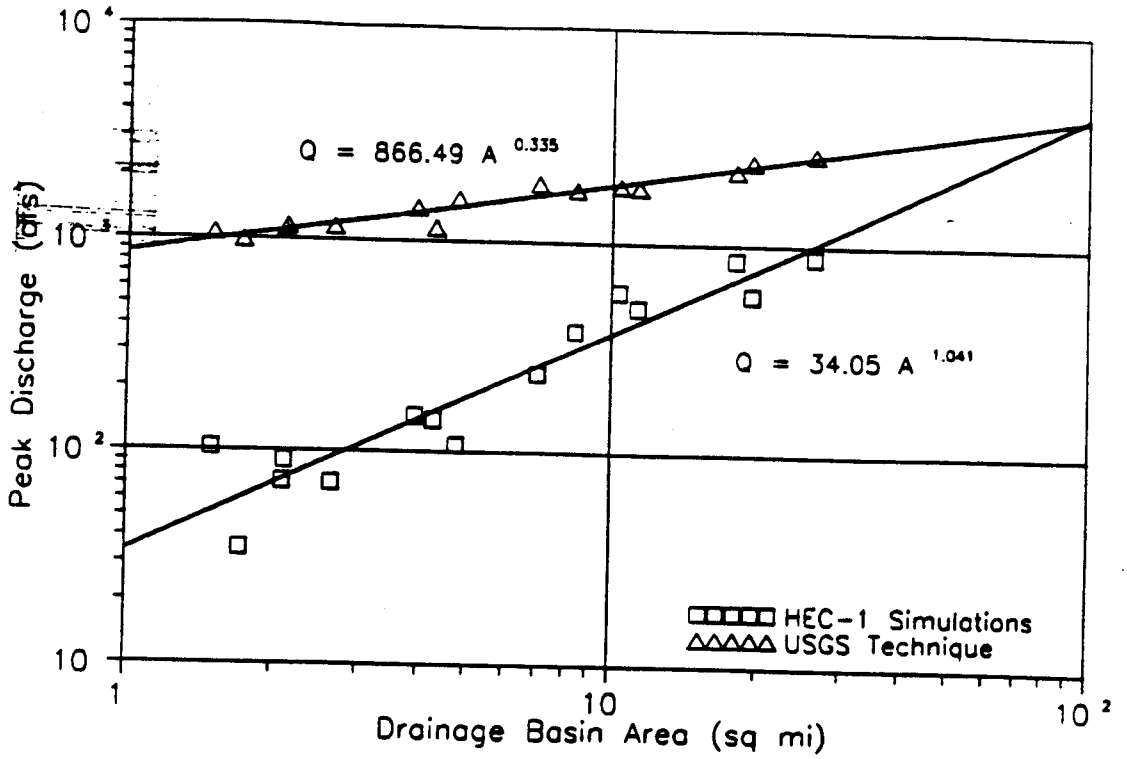


Fig. 8. Comparison of HEC-1 and USGS 100-yr peak discharges at eastern DOE-LANL boundary.

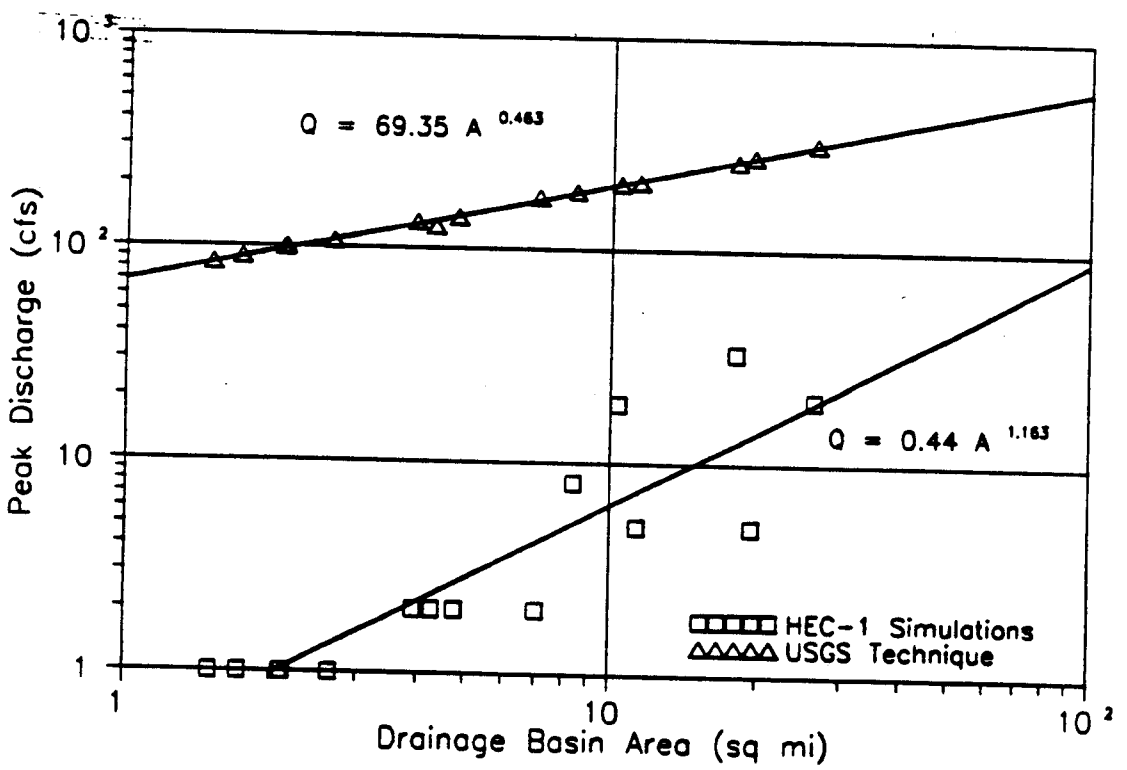


Fig. 9. Comparison of HEC-1 and USGS 2-yr peak discharges at eastern DOE-LANL boundary.

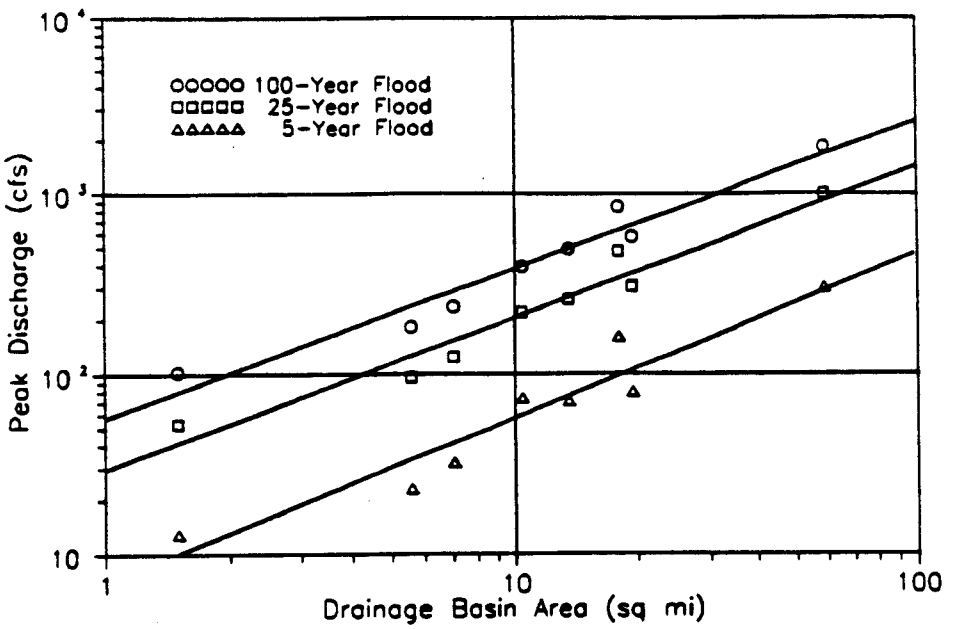


Fig. 10. Drainage basin area vs peak discharge at Rio Grande for Pajarito Plateau streams.

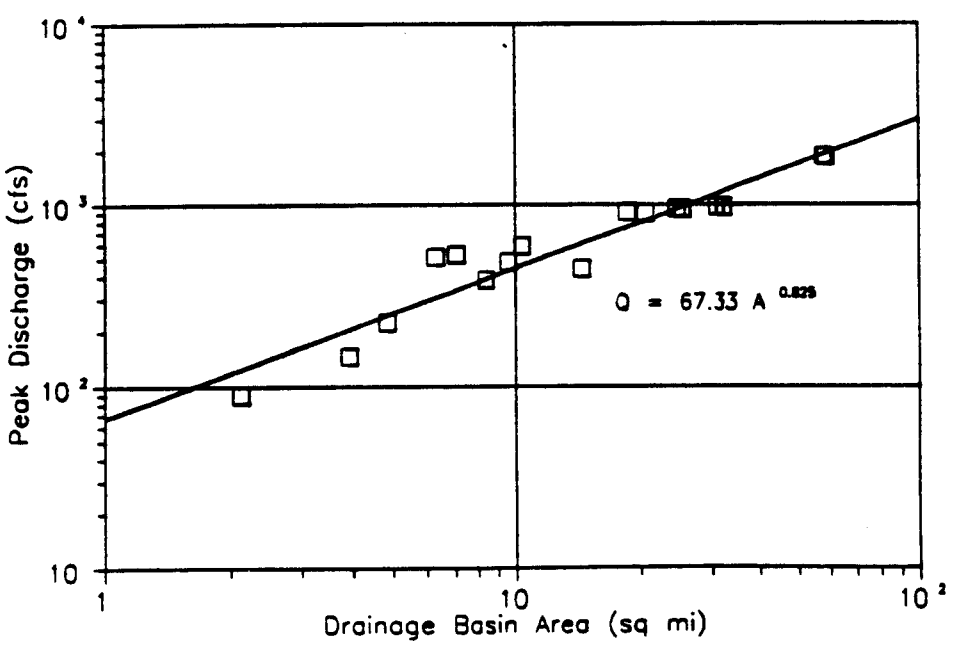


Fig. 11. Drainage basin area vs 100-yr peak discharge for Los Alamos Canyon.

Table 12. Synthetic streamflow data for Los Alamos Canyon at the Rio Grande confluence, as reported in Graf (1991, Appendix B4).

Year	Peak Flood (cfs)	Sediment Yield (tons)
1943	66	466
1944	631	8393
1945	0	61
1946	80	611
1947	2	65
1948	0	61
1949	0	61
1950	20	77
1951	687	9814
1952	386	6316
1953	4	12
1954	129	1006
1955	283	2783
1956	0	0
1957	649	16470
1958	203	2062
1959	59	532
1960	0	154
1961	53	443
1962	1	138
1963	283	2772
1964	0	0
1965	233	3163
1966	32	165
1967	361	4197
1968	924	14120
1969	149	2899
1970	0	0
1971	42	247
1972	0	0
1973	349	3955
1974	20	129
1975	6	99
1976	20	77
1977	4	8
1978	293	3198
1979	312	426
1980	0	183

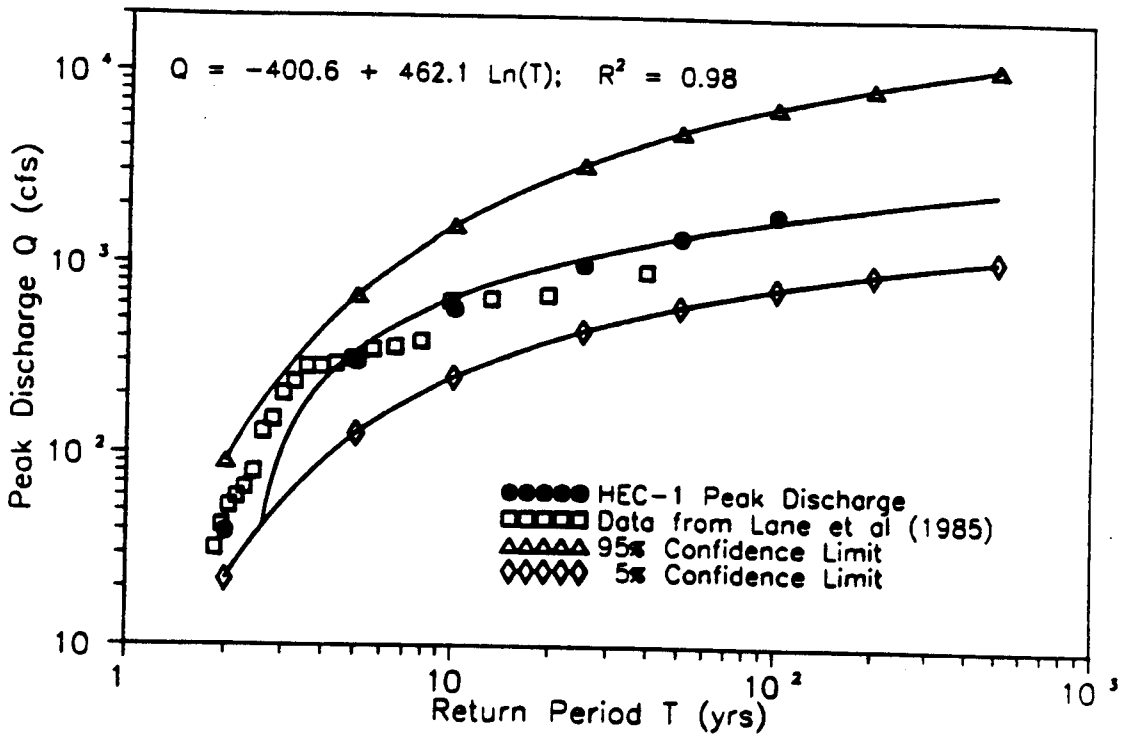


Fig. 12. Log-Pearson Type III analysis of synthetic and HEC-1 flood flows for Los Alamos Canyon at the Rio Grande.

natural and modified channel conditions. Water-surface profile analyses are commonly used to determine flood protection levee heights and flood hazard zones for insurance purposes. The HEC-1 and HEC-2 models are typically used in conjunction with one another for complex floodplain-assessment studies.

The HEC-2 program uses the standard-step numerical method that is based on energy losses to compute water-surface elevation changes between adjacent stream channel cross sections. These computed water-surface elevations correspond to hydrograph peak discharges obtained from HEC-1 simulations. Because energy, or friction, losses are intimately tied to Manning's equation for open channel flow, stream cross sections are required at locations where changes in discharge, slope, shape, and channel roughness occur. Here Manning's equation for English units is given by

$$Q = (1.49/n)AR^{2/3}S^{1/2} \text{ and } R = A/P, \qquad \text{(IV-1)}$$

where

Q	=	discharge (cfs),
A	=	area perpendicular to flow (ft^2),
R	=	hydraulic radius (ft),
P	=	wetted perimeter (ft),
S	=	energy slope (ft/ft), and
n	=	boundary surface roughness coefficient (dimensionless).

Water-surface profile calculations in HEC-2 begin at the downstream cross section for subcritical flow conditions and at the upstream cross section for supercritical flow. The same data rearranged

into a different order are used to make separate model simulations for each of these flow conditions. Model calculations sequentially progress either upstream (subcritical) or downstream (supercritical) from cross section to cross section. At bridge crossings and culverts, where flow hydraulics are more complex, momentum and other equations may be used to compute water-surface elevation changes. This model also takes into account losses resulting from contraction and expansion and from eddies, bends, and tributary junctions when adjustments are made to friction loss coefficients.

The HEC-2 computational methodology is based on the following flow conditions: (1) gradually varied steady flow, (2) one-dimensional flow with horizontal-velocity distribution corrections, (3) small channel slopes not exceeding ~10%, (4) a constant average friction slope between adjacent cross sections, and (5) rigid stream channel cross-sectional boundaries. Some hydraulic flow conditions that violate one or more of the above include (1) rapid downstream flood wave propagation resulting from dam breaching; (2) significant backwater effects caused by downstream boundary conditions such as tidal flows or tributary inflow effects; and (3) wide, flat floodplains that cause hydraulic flow disparities between the main channel and overbank areas.

It is not uncommon for many channel segments to have mixed flow regimes that are characterized by subcritical and supercritical flows that occur simultaneously in different parts of a single cross section or in adjacent cross sections. In these situations, the HEC-2 model must be run for both subcritical and supercritical flow conditions to determine the complete water-surface profile. However, most natural stream channels, including most mountain stream channels, exhibit subcritical flow conditions over the major part of their watercourses. The HEC-2 model is undoubtedly the most widely used technique for defining complex water-surface profiles. Many of the HEC-2 modeling capabilities are not described in detail here. Instead, the interested reader is referred to the HEC-2 user's manual (US Army COE 1982) for a complete description. Finally, it should be noted that the September 1988 FORTRAN version of the HEC-2 model, published as PROHEC2 (March 1990 release with modification 03) by Dodson & Associates, Inc., of Houston, Texas, was used in this study.

B. Stream Channel Geometries

In the HEC-2 model, flow-regime boundary geometry is defined by cross sections and the reach distances between adjacent cross sections. These cross sections, which characterize the flow capacity in the stream channel and overbank areas, are located at user-specified intervals along the stream channel. The model's accuracy can be increased if the distance between adjacent cross sections is reduced to allow more accurate computation of energy losses. Criteria for locating stream cross sections are given by Hoggan (1989, p. 335). According to him, reach lengths should not exceed 0.5 mi for wide floodplains having slopes <2 ft/mi, 1800 ft for slopes <3 ft/mi and 1200 ft for slopes >3 ft/mi. Obviously, there is a tradeoff between stream channel surveying costs and model accuracy requirements. Throughout this study, a constant reach distance of 250 ft was used to describe the geometries of all stream channel cross sections contained within the DOE-LANL complex. This implies literally hundreds of cross sections. However, costly field surveys were kept to a minimum because the majority of this topographic detail was automatically extracted from LANL's AUTOGIS-MOSS graphic information package.

There are actually three separate reach lengths required for each stream's cross section in HEC-2: one for the channel and one for each of the overbanks. HEC-2 uses a discharge-weighted, average reach length between adjacent cross sections and multiplies this distance by the average conveyance in energy loss calculations. Individual channel thalweg lengths were fixed at 250-ft intervals within MOSS. Actual stream channel locations were digitized from USGS 7.5 min base maps and read into MOSS. Cross-sections were uniquely located by MOSS using topographic profiles and geographically referenced coordinates. Because of thalweg meandering, it was assumed that both of the overbank reach lengths between all cross sections of stream channels within the DOE-LANL complex were fixed at 300 ft.

Once individual cross sections had been located within MOSS, a perpendicular topographic profile could be defined for the stream channel. Topographic data for cross sections were extracted from

Table 13. Typical HEC-2 input file identification scheme. See HEC-2 user manual for complete listing of all options.

Data Category	Record Identification	Data Description
Job Initialization	T1	Job ID Title Card (required)
	T2	Job ID Title Card (required)
	T3	Job ID Title Card (required)
	C	Comment Card for Documentation
Job Output Print Control	J1	Start Conditions and Options
	J2	Print Control and Options
	J3	Special Summary Printout Options
	J5	Special Summary Printout Options
	J6	Specify Friction Loss Equations
Job Control and Input Data Cards	QT	Peak Discharge Table from HEC-1
	NC	Manning cross-section n values
	NH	Horizontal Distance n values
	NV	Vertical Distance n values
	X1	Cross-Section ID and Data
	X3	Ineffective Flow Areas
	GR	Elevation and Station Data
	SB	Special Bridge Data Card
	BT	Bridge Geometry Data
	EJ	End of Run in Multiple Run Job
End of Job	ER	Required to End Job

MOSS and the cross sections were sequentially grouped. These groupings were then formatted within MOSS into an ASCII file, consistent with HEC-2 input data requirements, and exported to 5.25-in. magnetic disks for subsequent use. The actual input data file structure for all watersheds is very similar (see Disk No. 2). Table 13 illustrates a generic file structure for a typical subcritical flow simulation. All X1, X3, and GR data cards were generated in this fashion for each HEC-2 watershed simulation. These data files still required additional input parameters, as described below. Separate file configurations for both supercritical and subcritical conditions were generated for each stream channel, but only the latter configurations are given on Disk No. 2.

In spite of this procedure, the MOSS 2- and 10-ft topographic contour data were insufficient to hydraulically define main channel flows in HEC-2. Hence, an idealization of the main stream channel configuration was subsequently inserted into each profile as described below. These trapezoid-shaped channel inserts had a maximum top width of 4 ft, a maximum bottom width of 2 ft, and a fixed depth of 0.3 ft. Channel capacities for this idealized configuration do not exceed 1% of the specified 100-yr peak discharge for any section. Typically, this main channel insert is located near each profile midpoint and accounts for hydraulic variations in Manning's n-values between the main channel and overbank areas. In addition, this insert shape is characteristic of main channel geometries throughout Pajarito Plateau watersheds. Inclusion of these channel inserts proved satisfactory, and they were included in all subsequent HEC-2 simulations.

C. Channel Friction Losses

In HEC-2, the well-known Bernoulli equation is used to determine depths of flow between adjacent stream channel cross sections.

$$WL_2 + a_2V_2^2/2g = WL_1 + a_1V_1^2/2g + h_e$$

$$h_e = LS_f + C(a_2V_2^2/2g - a_1V_1^2/2g) \qquad \text{(IV-2)}$$

where

WL_1 and WL_2	=	upstream and downstream water elevations(ft),
V_1 and V_2	=	upstream and downstream mean velocities (ft/s),
a_1 and a_2	=	upstream and downstream velocity coefficients,
g	=	acceleration due to gravity (ft/sec^2),
h_e	=	energy head loss (ft),
L	=	discharge-weighted reach length (ft),
S_f	=	reach friction slope (dimensionless),
C	=	expansion or contraction loss coefficient, and
Q	=	peak discharge (Q = VA) at a section (cfs).

In general, the coefficient a in Equation (IV-2) is determined from the relationship

$$a = [(QV^2)_1 + (QV^2)_2 + \ldots + (QV^2)_k]/(QV^2)_{ave}. \qquad \text{(IV-3)}$$

where Q is discharge and V is velocity. The terms in the numerator represent complex velocity distribution effects in k localized subareas within a particular cross section, and the terms in the denominator represent average flow conditions in the entire cross section. Manning's Equation (IV-1) is initially used to determine how much of the cross-section's flow is in the channel and how much is in the overbank areas. Values for subarea conveyance (i.e., all terms in Manning's equation except the friction slope term) are therefore known if the friction (or energy) slope is assumed to be constant throughout a given cross section. The particular flow distribution between subareas at a given cross section is determined by multiplying the subarea conveyance and the square root of the friction slope. Localized mean velocities are determined by dividing subarea discharges by cross-section flow areas. Friction slope is approximated by the stream channel bottom slope because the water surface is assumed to parallel it in uniform flow. Hence, all of the terms in Equations (IV-2) and (IV-3) are known, except for a starting water-surface elevation at either the downstream (subcritical) or upstream (supercritical) end of the watercourse, expansion or contraction coefficients, Manning's roughness factor n, and stream discharge. All of these parameters are specified as input data. Therefore, iteration by the standard-step method is used to solve Equations (IV-2) and (IV-3) for WL at all remaining cross sections.

The iteration process mentioned above is terminated when successive, unknown water-surface elevation values at a given cross section converge to within 0.01 ft. Once this elevation has been determined, additional checks are performed to see if this value is above the critical depth for a subcritical simulation or below the critical depth for a supercritical run. If these checks indicate otherwise, then the critical depth is assumed to exist at that section, and a message is printed by the program. The simulation then continues with the next unknown water surface elevation at an adjacent cross section until the last profile is reached. It should be emphasized that the computed depths are constrained to be equal to or greater than the critical depth for subcritical simulations and equal to or less than the critical depth for supercritical runs. Hence, one must run separate simulations for subcritical and supercritical flows. On occasion, changes in velocity heads between adjacent cross sections are too great for the HEC-2 model to accurately determine the energy gradient. For these situations, the HEC-2 model will automatically insert up to three interpolated cross sections between two adjacent user-specified cross sections so that the velocity head difference does not exceed a user-specified amount, typically 0.5 ft. By comparing velocity

heads at successive cross sections the program also determines whether or not the flow is contracting or expanding. The program then applies the appropriate coefficient based on this determination.

It should be noted that only the subcritical flow depths at individual cross sections were used to map 100-yr floodplains in this study. While computed water surface elevations at individual cross sections occasionally corresponded to the critical depth at that section, supercritical depths were not subsequently calculated. The reason for this is straightforward: if a critical depth were found at a given section during a subcritical run, we would know that the actual flow depth must be equal to or less than the critical depth. Thus, the actual floodplain width will be equal to or less than the computed width at that cross-section. In other words, using a computed floodplain width from a subcritical flow simulation that corresponds to the critical depth is conservative, and the mapped floodplain is depicted as being wider than it would actually be. While this procedure is conservative if we are defining floodplain widths, it should not be used for any design calculations that utilize flow velocities (i.e., embankment stability or sediment transport calculations). The reason for this statement is that supercritical flow velocities are equal to or larger than the computed critical flow velocities.

Finally, it should be mentioned that friction losses can be simulated four different ways in the HEC-2 model. The actual technique employed can be user specified or automatically selected by the HEC-2 model according to certain selection criteria. These criteria are based on flow conditions (i.e., either subcritical or supercritical) and a comparison of friction slope changes between cross sections. All of these loss equations produce similar results when short reach lengths are used. Because relatively short reach lengths were used in this study, the automatic selection option was used here. In addition, a constant Manning's n-value of 0.09 was used in all stream channels, and an n-value of 0.12 was used for all overbank areas. The first value (Hoggan 1989, pp. 327-330) corresponds to a tabulated n-value for natural mountainous channels with deep pools, large boulders, and heavy timber stands. The second value corresponds to floodplains with heavy timber stands that have flood stages below branches, little undergrowth, and downed trees. All of these conditions are typical throughout the LANL complex. If localized conditions indicated a change was warranted, individual cross sections were occasionally given different n-values from those listed above. However, standard tabulated n-values were still employed. Perhaps it should also be noted that the effects of channel improvements were also simulated in Los Alamos Canyon near TA-41 and TA-2. These improvements are not discussed in detail here. Instead the interested reader is directed to the input data file for this site. Standard expansion/contraction coefficients of 0.2 and 0.4 were also used throughout this study for all watersheds.

D. Starting Water-Surface Elevations

The starting water-surface elevation must be specified for all HEC-2 simulations. This single parameter is the most difficult starting condition to determine. Typically, one of three techniques is used to establish this value. These techniques are (1) obtaining a known water-surface elevation from a channel rating curve or from direct field observations, (2) estimating a normal flow depth from slope/area computations, and (3) assuming the critical depth. In this study, a combination of the second and third techniques was used, as explained below.

Initially, the critical depth at the down stream cross section was assumed for all HEC-2 subcritical watershed simulations. These initial simulations yielded a preliminary estimate for the energy grade line passing through the first three cross sections located immediately adjacent to the starting cross-section. Hence, refined estimates for the starting water-surface elevation and the slope of the energy grade line at the downstream cross-section were obtained through linear interpolation. These values were specified on the J1 data card in the HEC-2 input data file, as seen in Table 13. A second simulation was then performed. The program computed a discharge for uniform flow conditions and compared it to the user-specified discharge. If there was a significant difference in these two discharge values, the program adjusted the starting water-surface elevation and computed a new normal discharge. This procedure was repeated until the normal discharge agreed to within 1% of the user-specified discharge. The final computed water-surface elevation was then taken as the

starting elevation. It should be noted that this elevation was still constrained to be equal to or greater than the critical depth for subcritical flow simulations and equal to or less than critical depth for supercritical runs. Once this starting depth was fixed, the remaining cross section's flow depths were computed as previously described. This technique worked for most stream channels. Occasionally, however, it was not successful and the critical depth was finally assumed to be the starting water-surface elevation for that watershed.

The above procedure implies that natural channels meet uniform flow conditions, that the energy grade is approximately equal to the average channel-bed slope, and that water surface-elevations can be obtained from a normal-depth calculation. These assumptions are probably conservative in most natural channels. This procedure will even accommodate situations where floodplain topography is relatively uneven. It should be pointed out, however, that floodplains at the eastern boundary of the DOE-LANL complex are relatively broad and flat. Hence the above procedure proved more than adequate.

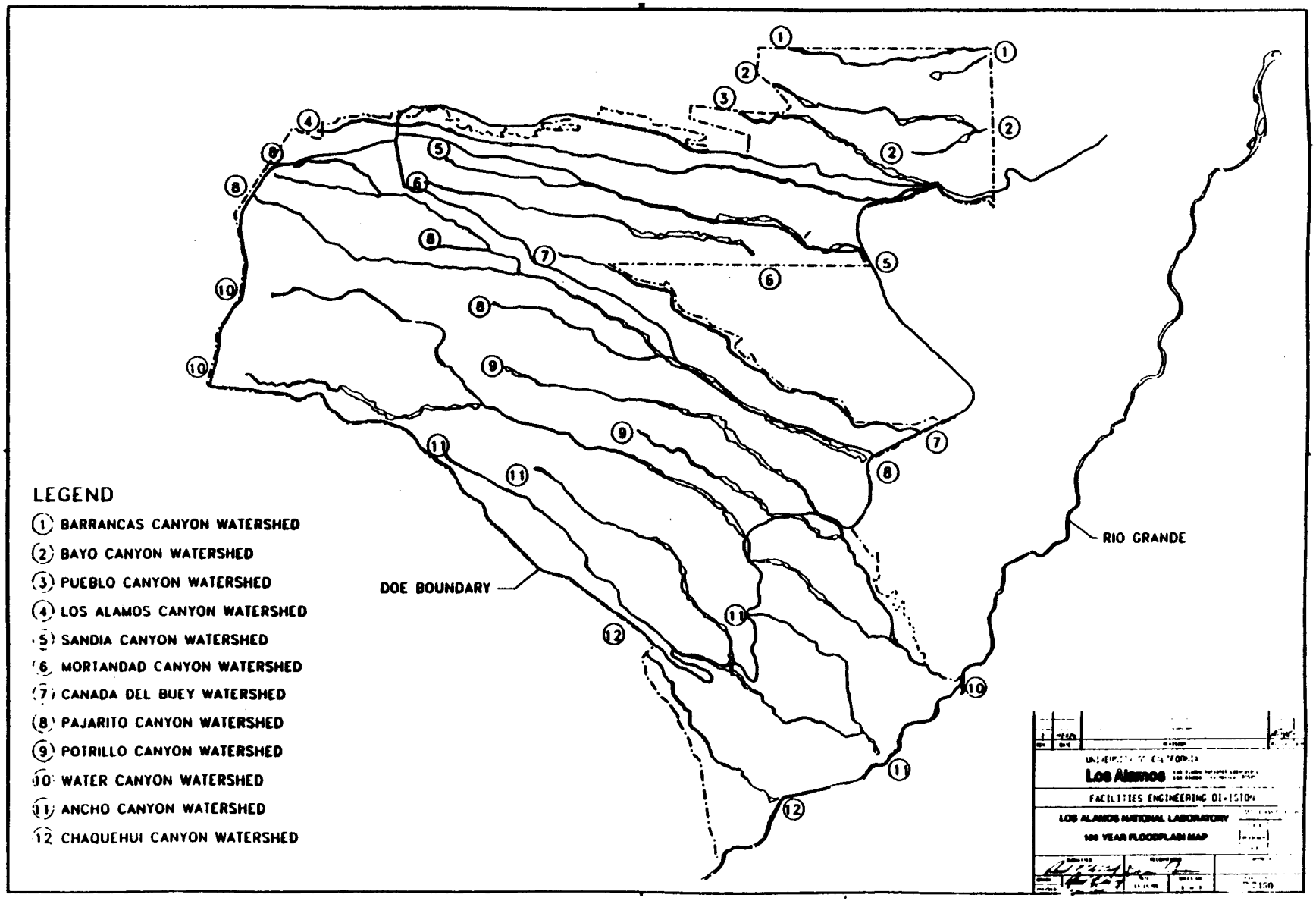
E. Computed Water-Surface Profiles

The above procedures were used to map all 100-yr floodplain boundaries within the DOE-LANL complex. The HEC-2-computed water-surface elevation at each channel section, along with the left and right channel stations where this water surface intersects the ground, were then read back into the MOSS system. This information was then transformed within MOSS to determine New Mexico state plane geographically referenced coordinates that uniquely define the 100-yr floodpool at each cross section. These paired coordinates were linked together as MOSS area features to identify each watershed floodplain. In this particular application, 11 separate elongated watersheds traverse LANL lands, with individual channels ranging up to 9 mi in length. The 100-yr floodplain was defined on each channel segment at 250 ft intervals. Figure 13 shows these preliminary floodplain boundaries. Detailed, 1:4800-scale maps with 10-ft topographic contours and floodplains were then generated by MOSS. Floodplain boundaries were defined by connecting 100-yr floodpool elevations located at channel cross sections with straight lines. These lines were then hand smoothed, using elevation contours and floodplain widths for control. This procedure was followed because occasional small stream bends that are located between cross sections periodically meander outside the original straight-line floodplain boundaries. Finally these smoothed boundaries were digitized within the MOSS system to define floodplains within the DOE-LANL facility. These floodplain boundary maps are intended to supplement this report and are maintained on file in LANL's ENG-2 group office.

Using the information provided in the appendixes of this report, the interested reader can replicate these floodplain maps. In addition, other important hydraulic data may be generated for individual watershed cross sections. This additional information is not included here because it is quite extensive. Using the HEC-1 and HEC-2 input data files listed on Disks 1 and 2, however, the reader can simply run individual watershed simulations and generate the data as required. When the HEC-2 model is used, approximately 40 different variables may be printed for each crosssection. Standard model output includes an input data file listing, detailed output for each section, summary tables, and line printer profile plots. This output can be directed to the computer screen for review, or it may be saved to an output file for later use. The user can tailor the majority of this output for specific needs. The HEC-2 input data files listed on Disk No. 2 of this report have been customized for limited output. The interested reader should be aware that these input data files may be modified to generate as much or a little information as he or she desires.

V. FINAL FLOODPLAIN DEFINITIONS

The procedure described in Appendix A initially defined floodplains in the MOSS system using the MOSS polygon feature to connect 100-yr floodpool elevations with straight lines. Ten-ft topographic contours were overlaid onto these floodplain boundaries and 25 maps were plotted at a scale


LEGEND
1 BARRANCAS CANYON WATERSHED
2 BAYO CANYON WATERSHED
3 PUEBLO CANYON WATERSHED
4 LOS ALAMOS CANYON WATERSHED
5 SANDIA CANYON WATERSHED
6 MORTANDAD CANYON WATERSHED
7 CANADA DEL BUEY WATERSHED
8 PAJARITO CANYON WATERSHED
9 POTRILLO CANYON WATERSHED
10 WATER CANYON WATERSHED
11 ANCHO CANYON WATERSHED
12 CHAQUEHUI CANYON WATERSHED
DOE BOUNDARY
RIO GRANDE
Los Alamos
FACILITIES ENGINEERING DIVISION
LOS ALAMOS NATIONAL LABORATORY
100 YEAR FLOODPLAIN MAP

of 1:4800. These maps provide coverage of the entire DOE-LANL complex. However, meandering stream channels occasionally crossed these straight-line floodplain boundaries at locations midway between HEC-2-defined stream cross sections. In order to correct this apparent inconsistency, the following additional mapping procedure was employed. For control, topographic contours and HEC-2 floodplain elevations and widths were used to hand smooth all straight-line floodplain boundaries between individual stream cross sections. It should be emphasized that original HEC-2 floodplain elevations and widths were not altered during this process. These new floodplain curvilinear boundaries were finally digitized and remain in MOSS system files (ENG-2 File Number R-7160).

VI. CONCLUSIONS

The following general conclusions can be stated:

1. The HEC procedures described here are recognized by the EPA, the COE, and others as being a state-of-the-art technique for mapping 100-yr floodplain boundaries in ungaged watersheds. This report documents this mapping procedure and, along with the floodplain boundary maps (ENG-2 File Number R-7160), is intended to satisfy the RCRA/HSWA permit condition requiring complete floodplain definitions within the DOE-LANL facility boundary.

2. The 100-yr floodplain boundary maps referenced herein are only intended to satisfy the RCRA/HSWA permit condition. Other applications of these maps at specific locations within the LANL complex may warrant additional site-specific field investigations and modified HEC-1 and HEC-2 simulations. For example, individual road culverts were often omitted in HEC-2 simulations. Furthermore, only MOSS 10-ft-contour-interval data were available for a large percentage of the DOE-LANL complex. These areas tended to be located within the canyons on the eastern facility boundary but are certainly not confined to these perimeter regions. Hence, additional floodplain mapping efforts would be desirable for specific waste disposal site investigations or any safety-related site evaluations.

3. LANL's AUTOGIS-MOSS graphic information system was used in this study to define all HEC-2 stream channel profiles at 250-ft intervals. These data were automatically extracted from the MOSS system in an ASCII format compatible with HEC-2 input data requirements. Approximately 65% of the DOE-LANL facility has 2-ft-topographic contour interval data, and 35% has 10-ft contour interval data. Once the HEC-2 model had been used to define floodplain boundaries for all major watershed channels, this information was read back into the MOSS system. Floodplains were initially defined by connecting 100-yr floodpool elevations with straight lines. These boundaries were then hand smoothed using topographic contours and floodplain widths and elevations for control. All original HEC-2 floodplain widths and elevations at stream cross sections were retained during this procedure. These new floodplain line boundaries were finally digitized and remain in MOSS system files.

4. Continuous rainfall-runoff simulation models calibrated to specific gaged watersheds may represent an improvement over the HEC-1 and HEC-2 modeling procedures employed in this study. However, extensions of these research models to ungaged watersheds have not been adequately documented in the literature. Criticism of the event-simulation approach centers on the design assumption that rainfall of a given frequency results in runoff of the same frequency. However, this issue was not addressed in this work. Until the dynamic nature of the rainfall-runoff process is better understood, HEC-1 and HEC-2 represent the best available technology for the definition of floodplains in ungaged watersheds.

5. The SCS curve number method was used in this study to predict runoff. The relative merits of this empirical approach versus physically based representations have been extensively debated in the literature. However, Loague and Freeze (1985) have shown that physically based models

generally do not predict runoff any better than relatively simple approaches. Furthermore, the SCS method has the advantage that future changes in watershed land-use patterns can be easily simulated.

6. The procedure outlined here is flexible in that other return-period intervals for the floodplain could also be computed. For example, other storm durations and return-period intervals could be used to define other floodplain boundaries. In addition, the Nuclear Regulatory Commission does not use a return-period definition for their floodplain elevation studies. Instead, they typically specify that the probable maximum flood (PMF) be used to define the floodplain. With minor changes, the input data files contained in this report could also be used to define the PMF floodplain boundary.

7. Flood flow studies described here can provide information for sediment transport simulations that use the HEC-6 model (US Army COE, 1977). For example, once floodplain elevations have been specified for a given canyon, one can associate a peak hydrograph with that floodplain definition. One could extend this hydrograph peak association to include a mean channel stream velocity for each individual canyon location. These mean velocities would obviously have future implications for sediment transport potential.

VII. ACKNOWLEDGMENTS

This study could not have been completed without the assistance of several key individuals. George Fuller, MOSS systems programer with Autometric, Inc., Lakewood, Colorado, developed the software to extract topographic data from LANL's AUTOGIS-MOSS graphical information system and to insert floodplain elevations back into this system. George Tauxe, Associate Professor, School of Civil Engineering and Environmental Science, University of Oklahoma, Norman, Oklahoma, participated in invaluable discussions concerning HEC-1 and HEC-2 input file structure and parameter evaluation techniques. Brian Comer, Section Leader with ENG-2 at LANL, provided MOSS system support and plotted all floodplain maps. Finally, Molly Magnuson, hydrologist with the US Army COE in Albuquerque, New Mexico, provided valuable information on various topics including the application of Snyder's unit hydrograph theory to New Mexico streams. These individuals' contributions to this effort are greatly appreciated.

VIII. REFERENCES

Borland, J.P., "A Proposed Stream Flow-data Program for New Mexico," US Geological Survey, Albuquerque office, open file report (September 1970) p. 71.

Bowen, B. M., "Los Alamos Climatology," Los Alamos National Laboratory report LA-11735-MS (May 1990).

Chow, V.T., D.R. Maidment, and L.W. Mays, *Applied Hydrology* (McGraw-Hill, New York, 1988) p. 572.

Comer, B.E., and S.G. McLin, *100-Year Floodplain Maps*, Los Alamos National Laboratory's Facilities Engineering Planning Group Office (ENG-2 File Number R-7160, 1991).

Graf, W.L., *Fluvial Processes in Dryland Rivers*, (Springer-Verlag, New York, 1988) p. 90.

Graf, W.L., "Geomorphology of Plutonium in the Northern Rio Grande System," Geography Dept., Arizona State Univ., Tempe, AZ.

Hoggan, D.H., *Computer-Assisted Floodplain Hydrology and Hydraulics* (McGraw-Hill Publishing Co., New York, 1989)

Lane, L.J., W.D. Purtymun, and N.M. Becker, "New Estimating Procedures for Surface Runoff, Sediment Yield, and Contaminant Transport in Los Alamos County, New Mexico," Los Alamos National Laboratory report LA-10335-MS (April 1985)

Loague, K.M., and R.A. Freeze, "A Comparison of Rainfall-Runoff Modeling Techniques for Small Upland Catchments", *Water Resources Research, Washington, DC*, **21** (2) p. 229–248 (1985).

Linsley, R.K., M.A. Kohler, and J.L.H. Paulhus, *Hydrology for Engineers* (McGraw-Hill, New York, 1982).

Miller, J.F., R.H. Frederick, and R.J. Tracy, *Precipitation-Frequency Atlas of the Western United States*, Vol. IV (US Government Printing Office, Washington, DC, 1973).

Nyhan, J.W., L.W. Hacker, T.E. Calhoun, and D.L. Young, "Soil Survey of Los Alamos County, New Mexico," Los Alamos Scientific Laboratory report LA-6779-MS (June 1978).

Scott, A.G., "Preliminary Flood-Frequency Relations and Summary of Maximum Discharges in New Mexico: A Progress Report," US Geological Survey, Albuquerque, open-file report (June 1971).

US Soil Conversation Service, Hydrology Supplement A to Section 4, *Engineering Handbook*; (US Government Printing Office, Washington, DC, 1968).

Thomas, R.P., and R.L. Gold, "Techniques for Estimating Flood Discharges for Unregulated Streams in New Mexico," US Geological Survey, Water Resources Investigations report 82-24 (1982).

US Army Corps of Engineers, *Flood Hydrograph Analysis and Computation*, Pub. No. EM-1110-2-1405 (US Government Printing Office, Washington, DC, 1959).

US Army Corps of Engineers, *HEC-6 Scour and Deposition in Rivers and Reservoirs*, Users Manual for Computer Program 723-G2-L2470 (The Hydrologic Engineering Center, Davis California, 1977).

US Army Corps of Engineers, *HEC-1 Flood Hydrograph Package*, Users Manual for Computer Program 723-X6-L2010 (The Hydrologic Engineering Center, Davis, California, 1990).

US Army Corps of Engineers, *HEC-2 Water Surface Profiles*, Users Manual for Computer Program 723-X6-L202A (The Hydrologic Engineering Center, Davis, California, 1982).

US Army Corps of Engineers, *Flood Flow Frequency Analysis*, Users Manual for Computer Program 723-X6-L7550 (The Hydrologic Engineering Center, Davis, California, 1982).

US Bureau of Reclamation, *Design of Small Dams*, (US Government Printing Office, Washington, DC, 1977).

Waltemeyer, S.D., "Techniques for Estimating Flood-Flow Frequency for Unregulated Streams in New Mexico," US Geological Survey, Water Resources Investigations report 86-4104 (1986).

Water Resources Council, *A Uniform Technique for Determining Flood Flow Frequencies*, Bulletin No. 15 (Water Resources Council, Washington, DC, 1967).

Water Resources Council, *Guidelines for Determining Flood Flow Frequency*, Bulletin No. 17B (Water Resources Council, Washington, DC, 1981).

Viessman, W., J.W. Knapp, G.L. Lewis, and T.E. Harbaugh, *Introduction to Hydrology*, 2nd ed. (Harper and Row Publishers, New York, 1977).

APPENDIX A
AUTOGIS-MOSS SYSTEM

I. Extraction of MOSS Topographic Data

This section documents the procedure used to automatically extract topographic data from LANL's graphic information system for use in HEC-2 simulations. Readers who are not familiar with the procedure can skip to the next section without loss in continuity. The MOSS source codes used to extract this topographic data are given on Disk No. 1 in this report.

In order to transport MOSS topographic data to an HEC-2 input data file, a series of user-activated steps was performed on existing and derived MOSS data sets. This procedure is briefly described below. The source programs to extract this information were developed by Autometric, Inc., under contract to LANL, and are maintained on the AUTOGIS-MOSS system by ENG-2. Section III of this appendix contains a complete source listing of these programs. Note that these programs require other MOSS utility features, which are described in the MOSS users manual. The sample MOSS session listed below details all necessary interactive user responses in a typical MOSS data-extraction process. Note that MOSS computer terminal user responses are in bold letters.

MOSS data extraction requirements for HEC-2 utilization include topographic contour files and stream channel location files. The contour files already existed in the LANL's MOSS system and were originally obtained from aerial photography transformations. The stream channel location files were created for this floodplain study by digitizing major stream channel locations from USGS 7.5-min topographic maps and geographically referencing them to known bench marks. These location files, which indicate the stream center line and have the drainage basin name as their subject, were entered into MOSS in a line format. The MOSS file name containing these stream channel location files is DRAINS. The MOSS topographic data are also in a line format and have numerical subjects that equal their represented elevations. These topographic data are actually included on a series of MOSS contour maps having either 2- or 10-ft contour intervals. However, in order to obtain complete topographic coverage for a given watershed, use of both the 2- and 10-ft-contour-interval maps was required. This resulted in a total number of contour maps that exceeded the maximum allowable active IDs within MOSS. Hence, the 2- and 10-ft-contour-interval maps of the entire LANL complex were merged into a series of single maps each containing both 2- and 10-ft-contour-interval data. The resultant MOSS master project file, LANLM, contains these merged contour maps. This master project file, which represents the resultant file from the MOSS utility entiled MAPIDX, also contains the maps, DRAINS and LANLINDEX, as described below. Using the stream location file, DRAINS, and the contour map index, LANLINDEX, it is a straightforward process to identify those merged MOSS contour maps that may be required for a given watershed application.

For each watershed draining the LANL complex, a file was constructed that defined the map names containing the topographic data This file was then used with the MOSS SELECT command using the FROM option. For more information concerning the SELECT FROM command, see the MOSS user's manual or use the MOSS HELP SELECT command. A list of the SELECT FROM files used in this study includes

FORALAMOS	FORANCHO	FORBAYO	FORCANADA	FORCHAQUE
FORINDEX	FORMORTAN	FORPAJAR0	FORPAJAR1	FORPAJAR2
FORPOTRIL	FORPUBELO	FORSANDIA	FORWATER	

The file, USESPLAT, was also used with the SELECT FROM command, as illustrated by the following example:

```
SELECT FROM FORALAMOS USESPLAT
```

The content of USESPLAT is the single ASCII character "*", which is the MOSS wild card character that matches any character string, and is similar to the AOS/VS "+" template.

There is also a set of files that were used in conjunction with the special FORINDEX file. This file contains all the contour map minimum-bounding rectangles from the map index for each watershed. A list of the SELECT FROM FORINDEX files includes

FALAX	FANCX	FBAYX	FCANX	FCHAX
FMORX	FPAJX0	FPAJX1	FPAJX2	FPOTX
FPUEX	FSANX	FWATX		

These files replace the USESPLAT file mentioned above, as illustrated by the following example:

SELECT FROM FORINDEX FALAX

The result of the SELECT FROM command produces from 1 to 38 active data sets from the merged contour maps, as detailed below. For a given watershed, the stream location file will be a single active ID within MOSS, while the corresponding contour data files will be several active IDs. It is possible that more than one ID will represent the stream location data and also that only one active ID will represent the topographic data. Derived data sets include extracted topographic profiles at stream cross sections and the imported maps produced from these profiles.

Once the stream location and contour data sets have been selected and placed into the active table as IDs, then the MOSS window must be set to include all of these data sets. The first stage of the data-extraction process (AHEC2) can now begin. The MOSS source code for the program AHEC2 is contained on Disk No. 1 in this report. The output from AHEC2 is imported into MOSS and visually checked. Once verified, the second stage of the data-extraction process (EXHEC2) can be initiated. The MOSS source code for the program EXHEC2 is also contained on Disk No. 1. The following abbreviated MOSS dialog provides an example of program execution. It is procedurally correct and represents either MOSS commands or programmatic dialog.

FREE ALL - Start with a clean active table

The selection of contour maps required for a given data-extraction application is best determined through the use of the utility procedure MAPIDX. This procedure will make an index map based on the minimum-bounding rectangular coverages of the contour maps. After plotting the stream location data and the index map, the user must select each contour map that contains topographic data of interest. Results of this utility execution were saved in the file named LANLINDEX. In this example, two files are used to select the contour data. The first file is called FORALAMOS and contains a list of the contour maps that could possibly contain topographic data on Los Alamos that may be of interest. The second file is called USESPLAT and contains the single wild-card character "*" to match all strings. For more information about these two files, see the MOSS users manual under SELECT FROM.

SELect DRAINAGE SUbject *ALAMOS* — Select stream location files for this run.

SELect FROM FORALAMOS USESPLAT — Select all contour maps around the Los Alamos Canyon drainage basin.

WIndow ALL — Set window to entire geographic region

AHEC2 — Invoke the AHEC2 program

At this point, the automated topographic data-extraction and file generator program, AHEC2, will prompt the user to give definable parameters before execution. In this example, there is one active ID for the stream location data, and there are 38 IDs for the contour data. The default vertical height and horizontal distance values are displayed by MOSS in square brackets. These default values are selected by hitting NEWLINE or CARRIAGE RETURN; alternate values may also be entered by the user. Here the vertical height refers to the maximum elevation difference

between the stream channel's highest and lowest elevation points within the profile. Horizontal distance refers to the distance along the profile located perpendicular to either side of the stream channel. The extracted topographic data will be constrained to these limits

Enter active IDs to use for DRAINAGES. 1

Enter active IDs to use for CONTOURS. 2 TH 39

Enter vertical HEIGHT from bottom of DRAINAGE [25] Carriage Return — 25 ft of vertical relief will be included in the stream channel profile.

Enter horizontal DISTANCE between PROFILES [250]. Carriage Return — the total profile width will be 250 ft on either side of the stream channel, giving a total profile distance of 500 ft.

The program could spend time determining which way is downhill or uphill. However, it is much simpler for the user to point with the graphics cursor to indicate drainage direction. After entering these points, the program will pause until the user enters an additional CARRIAGE RETURN, indicating that everything is correct and ready to proceed.

Point to DOWNHILL end of DRAINAGE — use graphics cursor. Point to UPHILL end of DRAINAGE — use graphics cursor. HIT NEWLINE TO CONTINUE.

Two MOSS IMPORT files are now generated. The first is a 2-D file containing profile lines at 250-ft intervals along the stream location file, and the second is a corresponding 3-D file containing data about stream channel cross sections. These 2-D profile lines were generated and used by AHEC2 to construct the 3-D cross sections by intersecting each 2-D profile line with all topographic contour data. The 3-D cross sections are a series of (X,Y,Z) triplets with the (x,y) portion defined by the intersection of a specific 2-D profile line with a specific contour line. The subject of the contour line determines the z portion, or elevation, of the triplet. The (x,z) data pairs in each triplet correspond to the station and elevation locations required on GR data cards in the HEC-2 input data file, as shown in Table 13. Note that this information is actually exported as (z,x) during the formatting process. It should also be noted that the first x value on a given cross section profile line is assigned a relative value of zero, and all remaining x values are referenced to this origin. This procedure is identical to that in the HEC-2 model as one looks downstream at the profile line. Hence, the first x position is located at the extreme left of the profile line as one looks downstream. The MOSS file maintains the original geographically referenced coordinate positions of all x values, but this information is not used in the HEC-2 model.

Results from the AHEC2 program are now imported to MOSS. The 2-D profile lines are not essential but allow the user to determine where contour data are missing. The 2-D profile lines are imported as a Type 2 map (line) with the input file name PROFILE.2D. The 3-D cross sections are critical to the second and final stage of the extraction process and must be imported to MOSS. The input file which is named PROFILE.3D, is imported as a Type 12 map [(x,y,z) line map]. Once imported, the resultant Type 12 map must be selected.

The selected ID will be used in the EXHEC2 program command procedure. This portion of the extraction program will take the (x,y,z) data pairs and reformat them into (z,x) pairs as required by the HEC-2 model input structure on GR cards, as seen in Table 13. The EXHEC2 program will ask the user to give an active data set for reformatting, a resultant target file name, and information on whether the file is for a subcritical or supercritical HEC-2 input data file. The program will not overwrite an existing file name unless specified by the user. The example given below illustrates this procedure.

EXHec2 — Invoke the HEC-2 reformatter program option.
Enter active data set ID to reformat to HEC-2 standard

```
[CR = Exit]
40
For LOSALA3D , EXHEC2 file name [EXHEC2]
SUBLOSALA — File name for Los Alamos Canyon subcritical run
Is this a SUB- or SUPER- critical run (SUB/SUPER) [SUB]
SUB
NUMBER OF DATA ITEMS TO BE REFORMATTED = 184
EXECUTING. PLEASE WAIT...
```

This example uses active ID 40 as the 3-D map of the cross section. The HEC-2 input data file will be called SUBLOSALA and is a subcritical run. The program informs the user that 184 3-D cross sections will be in the final HEC-2 input data file. SUBLOSALA is subsequently transferred to a 5.25-in. magnetic disk in ASCII format for direct use by the HEC-2 program. This data transfer procedure only creates T1, T2, X1, X3, and GR cards, as seen in Table 13. Hence, the HEC-2 user must still enter additional input parameters into this file before a successful HEC-2 simulation can be performed.

II. Insertion of Floodplain Boundaries

This section documents the procedure used to automatically reinsert HEC-2 floodplain boundaries into LANL's graphic information system for final map generation. Readers who are not familiar with the procedure can skip to the next section without loss in continuity. The MOSS source code used to reinsert HEC-2 flood plan boundaries into MOSS is listed on Disk No. 1 in this report.

Once the HEC-2 simulation has been successfully completed for a given stream channel segment, the HEC-2 floodplain boundaries must be read back into MOSS. This procedure is described below. Before this second transfer, however, the HEC-2 user must tailor model output for this floodplain boundary-insertion process. Required HEC-2 output includes the cross section's number; the left- and right-station numbers where the computed water surface intersects the ground; and the computed water-surface elevation, floodplain top width, floodplain depth, and cross-sectional flow area. The HEC-2 output file name must correspond to an original MOSS data-extraction output file, and all cross-section numbers must be identical in both files. The MOSS insertion program uses this HEC-2 file name and cross-section-numbering scheme to translate floodplain boundary data into unique, geographically referenced New Mexico state plain coordinates. The HEC-2 input data files listed on Disk No. 2 of this report are set up to provide the proper output to the MOSS insertion program. The first J3 card shown in Table 13 for each file actually provides this required output for the MOSS insertion procedure. All remaining HEC-2 output is extraneous and must be stripped from the HEC-2 output file. Hence, the HEC-2 user must edit output files with an independent file editor or word processor and remove all unnecessary information from an HEC-2 output file. This modified HEC-2 output file is now transferred back to the MOSS system in ASCII format on a 5.25-in magnetic disk. The actual insertion procedure can now begin.

To insert HEC-2 floodplain elevations into the MOSS system at known cross sections, a series of user-activated steps is performed on pre-existing MOSS data sets. These data sets correspond to the modified HEC-2 output files that were described above. The actual MOSS insertion procedure is briefly described here. The source program used to complete this task was developed by Autometric, Inc., under contract to LANL, and is maintained on the AUTOGIS-MOSS system by ENG-2; this source program is listed on Disk No. 1 of this report. The sample MOSS session listed below details all necessary interactive user responses in a typical floodplain boundary-insertion process.

FPHEC2 is the AUTOGIS-MOSS data-reformatting program, or command, and is the third and final step in the floodplain-modeling process. As mentioned above, this step makes use of data files generated from the actual HEC-2 modeling process and MOSS data files created with EXHEC2. The EXHEC2 command was described above; this command generates a 3-D floodplain MOSS import file. The FPHEC2 command format is specified as follows:

FPHec2 (active data set) (output file name).

The following dialog illustrates the use of this MOSS command in a typical floodplain data insertion procedure. Note that user responses are in bold letters.

Enter Command? FPHec2
Enter HEC-2 model results filename [CR = EXIT]
CANADA.DAT
Enter HEC-2 model Geo-Reference filename [CR = EXIT]
SUBCANA.REF
Enter resultant MOSS IMPORT floodplain name [CR = EXIT]
CANAFP.EXP
HEC RECORDS 158 REF RECORDS 156 CORDS 313

This example matches the HEC-2 output file named CANADA.DAT with the MOSS EXHEC2-generated Geo-Reference file named SUBCANA.REF and produces a MOSS import file named CANAFP.EXP. For each complete stream channel profile in both the MOSS Geo-Reference and the HEC-2 files, a pair of coordinate triplets (x,y,z) are generated. Once these triplets have been calculated, they are ordered by section number to form a 3-D polygon and written to the MOSS export file specified by the user. The HEC-2 output file must include each stream channel cross section number and the computed water-surface elevation. The Geo-Reference file's section numbers are checked to insure that they match. This is the only way to determine the actual New Mexico state plane ground coordinates that delineate the floodplain. The resulting MOSS import file should then be imported into MOSS as a Type 13 (3-D polygon) file. Finally, it should be noted that any HEC-2 sections that are not exactly matched with corresponding sections in the MOSS Geo-Reference file are not included in the final MOSS export file.

APPENDIX B
TABULATED HEC-1 INPUT PARAMETERS

GUAJE CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)
L = CHANNEL LENGTH TO WATER DIVIDE (ft)
X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)
CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)
S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)
Y = 100X/L = GROSS WATERSHED SLOPE (%)
A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	34000	3277	55	8.18	9.64	11.30	3.38
2	24000	947	68	4.71	3.95	3.25	2.86
3	46000	3600	69	4.49	7.83	9.59	3.33
4	12750	355	75	3.33	2.78	2.13	1.69
5	9000	215	70	4.29	2.39	1.45	1.59

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$
$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)
K = L/(3600*Vel) (hours)
Nstps = 60K/NMIN (dimensionless)
NSTPS = INTEGER VALUE FOR Nstps
NMIN = MINUTES FROM CARD IT
$1/[2(1-x)] < CHECK < 1/(2x)$
CHECK = (60K)/(NMIN*NSTPS)

x = 0.20
R(ft) = 2.00
n = 0.10
NMIN = 15.00
1/[2(1-x)] = 0.63
1/(2x) = 2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	34000	7.3	1.29	5.14	5	1.03	1.29
2	24000	4.7	1.42	5.67	6	0.95	1.42
3	46000	6.6	1.93	7.72	8	0.97	1.93
4	12750	3.9	0.90	3.59	4	0.90	0.90
5	9000	3.7	0.68	2.73	3	0.91	0.68

BARRANCAS CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	25500	1245	72	3.89	4.88	1.79	2.42
2	7250	750	76	3.16	10.34	0.33	0.54
3	23000	1267	72	3.89	5.51	2.52	2.10
4	3250	365	76	3.16	11.23	0.21	0.27

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

NMIN = MINUTES FROM CARD IT

$1/[2(1-x)] < CHECK < 1/(2x)$

CHECK = (60K)/(NMIN*NSTPS)

x	=	0.20
R(ft)	=	2.00
n	=	0.10
NMIN	=	15.00
1/[2(1-x)]	=	0.63
1/(2x)	=	2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	25500	5.2	1.36	5.42	5	1.08	1.36
2	7250	7.6	0.26	1.06	1	1.06	0.26
3	23000	5.6	1.15	4.60	5	0.92	1.15
4	3250	7.9	0.11	0.46	1	0.46	0.11

BAYO CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)
L = CHANNEL LENGTH TO WATER DIVIDE (ft)
X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)
CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)
S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)
Y = 100X/L = GROSS WATERSHED SLOPE (%)
A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	16750	745	65	5.38	4.45	1.57	2.19
2	15250	535	74	3.51	3.51	1.16	1.79
3	12750	945	75	3.33	7.41	1.19	1.04

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$
$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)
K = L/(3600*Vel) (hours)
Nstps = 60K/NMIN (dimensionless)
NSTPS = INTEGER VALUE FOR Nstps
NMIN = MINUTES FROM CARD IT
$1/[2(1-x)] < CHECK < 1/(2x)$
CHECK = (60K)/(NMIN*NSTPS)

x	=	0.20
R(ft)	=	2.00
n	=	0.10
NMIN	=	15.00
1/[2(1-x)]	=	0.63
1/(2x)	=	2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	16750	5.0	0.93	3.73	4	0.93	0.93
2	15250	4.4	0.96	3.82	4	0.96	0.96
3	12750	6.4	0.55	2.20	2	1.10	0.55

PUEBLO CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	15000	1930	56	7.86	12.87	2.24	1.48
2	24000	694	65	5.38	2.89	4.61	3.62
3	14000	246	74	3.51	1.76	1.55	2.37

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

NMIN = MINUTES FROM CARD IT

$1/[2(1-x)] < CHECK < 1/(2x)$

CHECK = (60K)/(NMIN*NSTPS)

x	=	0.20
R(ft)	=	2.00
n	=	0.10
NMIN	=	15.00
$1/[2(1-x)]$	=	0.63
$1/(2x)$	=	2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	15000	8.5	0.49	1.96	2	0.98	0.49
2	24000	4.0	1.66	6.63	7	0.95	1.66
3	14000	3.1	1.24	4.96	5	0.99	1.24

LOS ALAMOS CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	20000	1943	52	9.23	9.72	6.33	2.37
2	10000	531	62	6.13	5.31	0.74	1.43
3	35000	846	68	4.71	2.42	3.31	4.95
4	11750	525	80	2.50	4.47	1.96	1.08
5	5000	100	75	3.33	2.00	0.77	0.95
6	7750	165	75	3.33	2.13	0.67	1.30

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

NMIN = MINUTES FROM CARD IT

1/[2(1-x)] < CHECK < 1/(2x)

CHECK = (60K)/(NMIN*NSTPS)

x = 0.20

R(ft) = 2.00

n = 0.10

NMIN = 15.00

1/[2(1-x)] = 0.63

1/(2x) = 2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	20000	7.4	0.75	3.01	3	1.00	0.75
2	10000	5.5	0.51	2.04	2	1.02	0.51
3	35000	3.7	2.64	10.57	11	0.96	2.64
4	11750	5.0	0.65	2.61	3	0.87	0.65
5	5000	3.3	0.42	1.66	2	0.83	0.42
6	7750	3.5	0.62	2.49	2	1.25	0.62

SANDIA CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	36750	1000	68	4.71	2.72	2.65	4.85
2	11750	370	75	3.33	3.15	0.85	1.49
3	10000	300	76	3.16	3.00	1.32	1.31
4	9000	635	79	2.66	7.06	0.75	0.72

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

NMIN = MINUTES FROM CARD IT

$1/[2(1-x)] < CHECK < 1/(2x)$

CHECK = (60K)/(NMIN*NSTPS)

x = 0.20

R(ft) = 2.00

n = 0.10

NMIN = 15.00

1/[2(1-x)] = 0.63

1/(2x) = 2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	36750	3.9	2.62	10.46	10	1.05	2.62
2	11750	4.2	0.78	3.11	3	1.04	0.78
3	10000	4.1	0.68	2.71	3	0.90	0.68
4	9000	6.3	0.40	1.59	2	0.80	0.40

MORTANDAD CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	9000	390	65	5.38	4.33	0.55	1.35
2	10500	277	67	4.93	2.64	0.81	1.86
3	6000	125	72	3.89	2.08	0.36	1.17
4	12250	203	72	3.89	1.66	1.61	2.31
5	16000	465	72	3.89	2.91	0.86	2.16
6	13500	855	74	3.51	6.33	1.72	1.21

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

NMIN = MINUTES FROM CARD IT

1/[2(1-x)] < CHECK < 1/(2x)

CHECK = (60K)/(NMIN*NSTPS)

x	=	0.20
R(ft)	=	2.00
n	=	0.10
NMIN	=	15.00
1/[2(1-x)]	=	0.63
1/(2x)	=	2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	9000	4.9	0.51	2.03	2	1.02	0.51
2	10500	3.8	0.76	3.04	3	1.01	0.76
3	6000	3.4	0.49	1.95	2	0.98	0.49
4	12250	3.0	1.12	4.47	4	1.12	1.12
5	16000	4.0	1.10	4.41	4	1.10	1.10
6	13500	6.0	0.63	2.52	3	0.84	0.63

CANADA DEL BUEY

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)
L = CHANNEL LENGTH TO WATER DIVIDE (ft)
X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)
CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)
S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)
Y = 100X/L = GROSS WATERSHED SLOPE (%)
A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	29500	836	69	4.49	2.83	2.10	3.88
2	14750	1345	72	3.89	9.12	2.42	1.14

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$
$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)
K = L/(3600*Vel) (hours)
Nstps = 60K/NMIN (dimensionless)
NSTPS = INTEGER VALUE FOR Nstps
NMIN = MINUTES FROM CARD IT
$1/[2(1-x)] < CHECK < 1/(2x)$
CHECK = (60K)/(NMIN*NSTPS)

x = 0.20
R(ft) = 2.00
n = 0.10

NMIN = 15.00
$1/[2(1-x)]$ = 0.63
$1/(2x)$ = 2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	29500	4.0	2.06	8.23	8	1.03	2.06
2	14750	7.1	0.57	2.29	2	1.15	0.57

PAJARITO CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	17250	2711	52	9.23	15.72	1.99	1.66
2	18250	795	62	6.13	4.36	2.57	2.56
3	28250	2890	61	6.39	10.23	3.28	2.43
4	11000	205	70	4.29	1.86	0.67	2.12
5	19500	710	67	4.93	3.64	1.70	2.59
6	15000	225	72	3.89	1.50	1.15	2.86
7	15500	1050	73	3.70	6.77	2.24	1.34

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

NMIN = MINUTES FROM CARD IT

1/[2(1-x)] < CHECK < 1/(2x)

CHECK = (60K)/(NMIN*NSTPS)

x = 0.20

R(ft) = 2.00

n = 0.10

NMIN = 15.00

1/[2(1-x)] = 0.63

1/(2x) = 2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	17250	9.4	0.51	2.04	2	1.02	0.51
2	18250	4.9	1.03	4.11	4	1.03	1.03
3	28250	7.6	1.04	4.15	4	1.04	1.04
4	11000	3.2	0.95	3.78	4	0.95	0.95
5	19500	4.5	1.20	4.80	5	0.96	1.20
6	15000	2.9	1.44	5.75	6	0.96	1.44
7	15500	6.2	0.70	2.80	3	0.93	0.70

POTRILLO CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)
L = CHANNEL LENGTH TO WATER DIVIDE (ft)
X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)
CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)
S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)
Y = 100X/L = GROSS WATERSHED SLOPE (%)
A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	28500	875	70	4.29	3.07	2.78	3.53
2	18000	630	71	4.08	3.50	1.03	2.23
3	9750	620	75	3.33	6.36	0.96	0.90

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$
$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)
K = L/(3600*Vel) (hours)
Nstps = 60K/NMIN (dimensionless)
NSTPS = INTEGER VALUE FOR Nstps
NMIN = MINUTES FROM CARD IT
$1/[2(1-x)] < CHECK < 1/(2x)$
CHECK = (60K)/(NMIN*NSTPS)

x = 0.20
R(ft) = 2.00
n = 0.10

NMIN = 15.00
1/[2(1-x)] = 0.63
1/(2x) = 2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	28500	4.1	1.91	7.64	8	0.95	1.91
2	18000	4.4	1.13	4.52	5	0.90	1.13
3	9750	6.0	0.45	1.82	2	0.91	0.45

WATER CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)
L = CHANNEL LENGTH TO WATER DIVIDE (ft)
X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)
CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)
S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)
Y = 100X/L = GROSS WATERSHED SLOPE (%)
A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	18000	2305	54	8.52	12.81	4.07	1.81
2	17750	705	62	6.13	3.97	2.63	2.62
3	19000	405	72	3.89	2.13	1.42	2.90
4	13750	615	72	3.89	4.47	1.97	1.55
5	5000	405	77	2.99	8.10	0.32	0.44

HEC-1 INPUT DATA FILE PARAMETER CALCULATION
SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$
$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)
K = L/(3600*Vel) (hours)
Nstps = 60K/NMIN (dimensionless)
NSTPS = INTEGER VALUE FOR Nstps
NMIN = MINUTES FROM CARD IT
$1/[2(1-x)] < CHECK < 1/(2x)$
CHECK = (60K)/(NMIN*NSTPS)

x = 0.20
R(ft) = 2.00
n = 0.10

NMIN = 15.00
1/[2(1-x)] = 0.63
1/(2x) = 2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	18000	8.5	0.59	2.36	2	1.18	0.59
2	17750	4.7	1.05	4.18	4	1.05	1.05
3	19000	3.5	1.53	6.11	6	1.02	1.53
4	13750	5.0	0.76	3.05	3	1.02	0.76
5	5000	6.7	0.21	0.83	1	0.83	0.21

CANON DE VALLE

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	22500	2756	53	8.87	12.25	2.33	2.26
2	7500	393	63	5.87	5.24	0.78	1.12
3	12500	477	64	5.63	3.82	1.17	1.92

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

NMIN = MINUTES FROM CARD IT

1/[2(1-x)] < CHECK < 1/(2x)

CHECK = (60K)/(NMIN*NSTPS)

x	=	0.20
R(ft)	=	2.00
n	=	0.10
NMIN	=	15.00
1/[2(1-x)]	=	0.63
1/(2x)	=	2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	22500	8.3	0.75	3.02	3	1.01	0.75
2	7500	5.4	0.38	1.54	2	0.77	0.38
3	12500	4.6	0.75	3.01	3	1.00	0.75

ANCHO CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	25750	1044	68	4.71	4.05	2.19	2.99
2	22000	1035	69	4.49	4.70	2.48	2.38
3	13000	1102	74	3.51	8.48	1.11	1.01
4	10000	688	75	3.33	6.88	1.04	0.89
5	2500	168	75	3.33	6.72	0.19	0.30

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

NMIN = MINUTES FROM CARD IT

$1/[2(1-x)] < CHECK < 1/(2x)$

CHECK = (60K)/(NMIN*NSTPS)

x	=	0.20
R(ft)	=	2.00
n	=	0.10
NMIN	=	15.00
1/[2(1-x)]	=	0.63
1/(2x)	=	2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	25750	4.8	1.50	6.01	6	1.00	1.50
2	22000	5.1	1.19	4.76	5	0.95	1.19
3	13000	6.9	0.52	2.10	2	1.05	0.52
4	10000	6.2	0.45	1.79	2	0.90	0.45
5	2500	6.1	0.11	0.45	1	0.45	0.11

CHAQUEHUI CANYON

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	16500	1292	73	3.70	7.83	1.50	1.31

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

NMIN = MINUTES FROM CARD IT

$1/[2(1-x)] < CHECK < 1/(2x)$

CHECK = (60K)/(NMIN*NSTPS)

x	=	0.20
R(ft)	=	2.00
n	=	0.10
NMIN	=	15.00
1/[2(1-x)]	=	0.63
1/(2x)	=	2.50

BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	16500	6.6	0.69	2.77	3	0.92	0.69

CANON DE LOS FRIJOLES

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE UD DATA CARD FOR SCS UNIT HYDROGRAPH LAG TIME DEFINITIONS

$T = (L^{0.8})(S+1)^{0.7}/(1900Y^{0.5})$ = SCS BASIN LAG TIME (hrs)

L = CHANNEL LENGTH TO WATER DIVIDE (ft)

X = BASIN ELEVATION CHANGE OVER LENGTH L (ft)

CN= SCS CURVE NUMBER FOR AMC-II MOISTURE CONDITIONS (dim)

S = 1000/CN - 10 = POTENTIAL RAINFALL RETENTION (in)

Y = 100X/L = GROSS WATERSHED SLOPE (%)

A = SUB-BASIN DRAINAGE AREA (sq. miles)

BASIN NO.	L (ft)	X (ft)	CN	S	Y (%)	A (sm)	T (hrs)
1	20200	2499	50	10.00	12.37	4.97	2.23
2	24400	1030	70	4.29	4.22	4.92	2.66
3	24000	633	68	4.71	2.64	8.13	3.50

HEC-1 INPUT DATA FILE PARAMETER CALCULATION

SEE RM DATA CARD FOR MUSKINGUM ROUTING PARAMETER DEFINITIONS

$0.1 < x < 0.3$

$Vel = 1.49R^{0.67}S^{0.5}/n$ (ft/sec)

K = L/(3600*Vel) (hours)

Nstps = 60K/NMIN (dimensionless)

NSTPS = INTEGER VALUE FOR Nstps

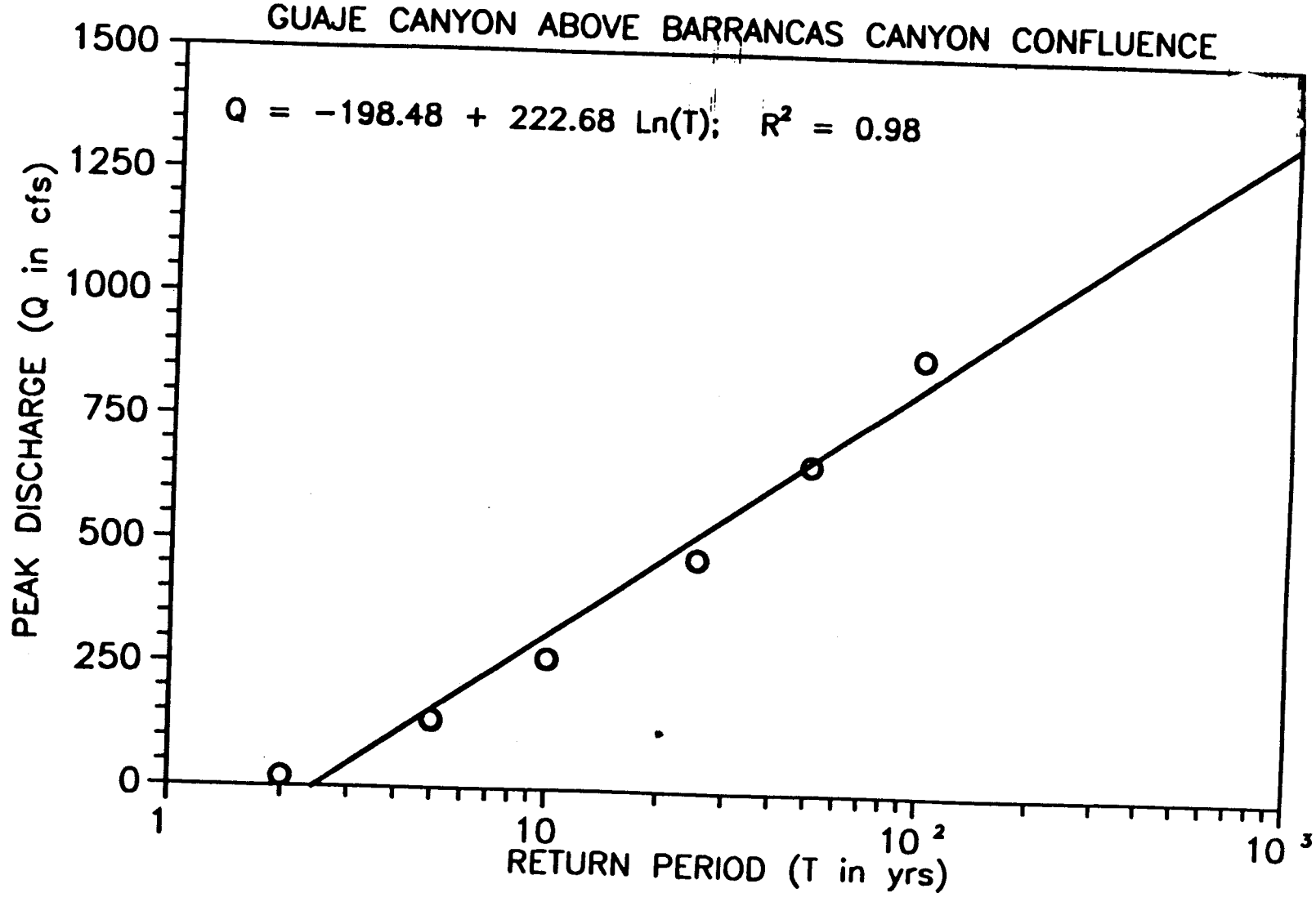
NMIN = MINUTES FROM CARD IT

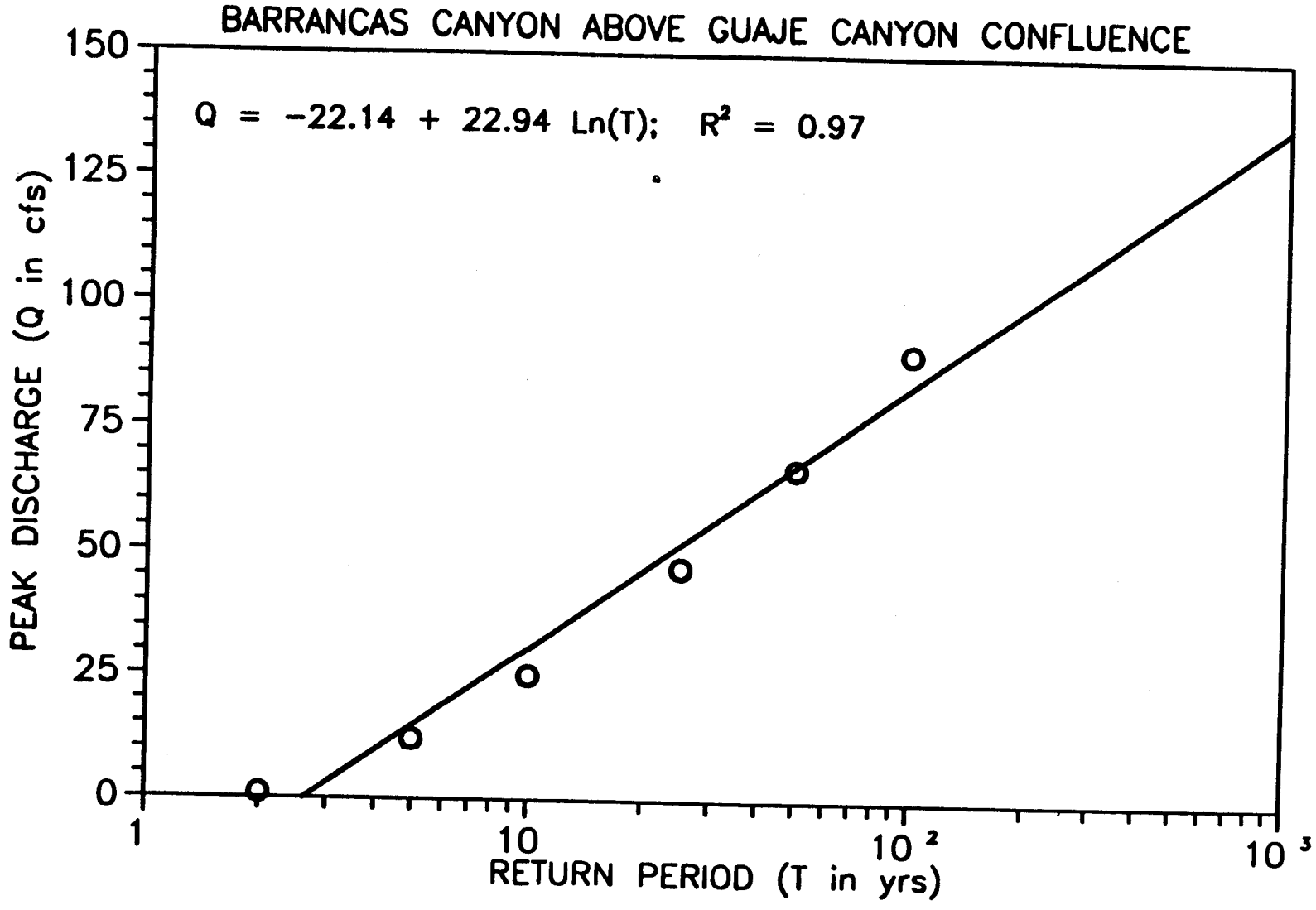
$1/[2(1-x)] < CHECK < 1/(2x)$

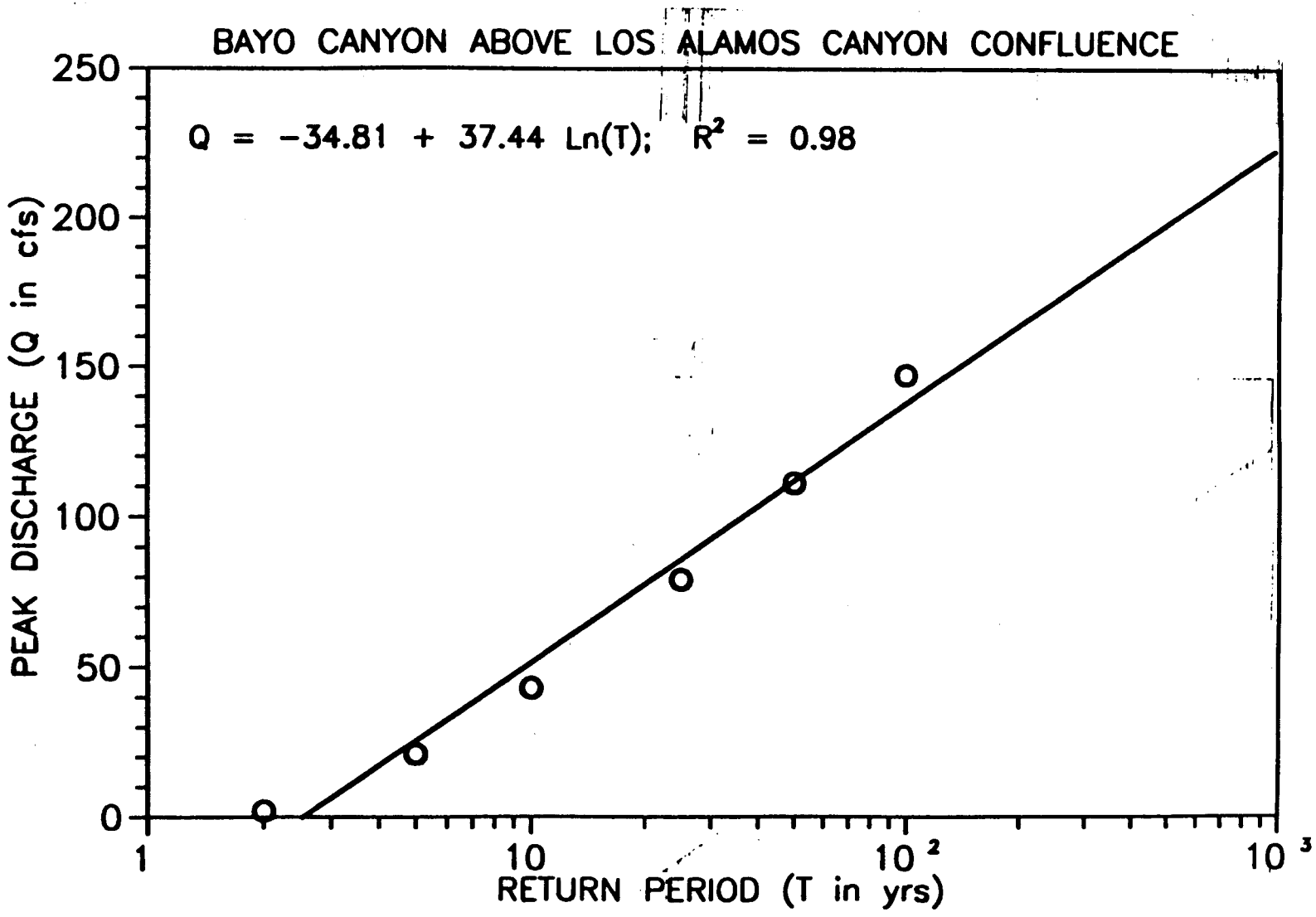
CHECK = (60K)/(NMIN*NSTPS)

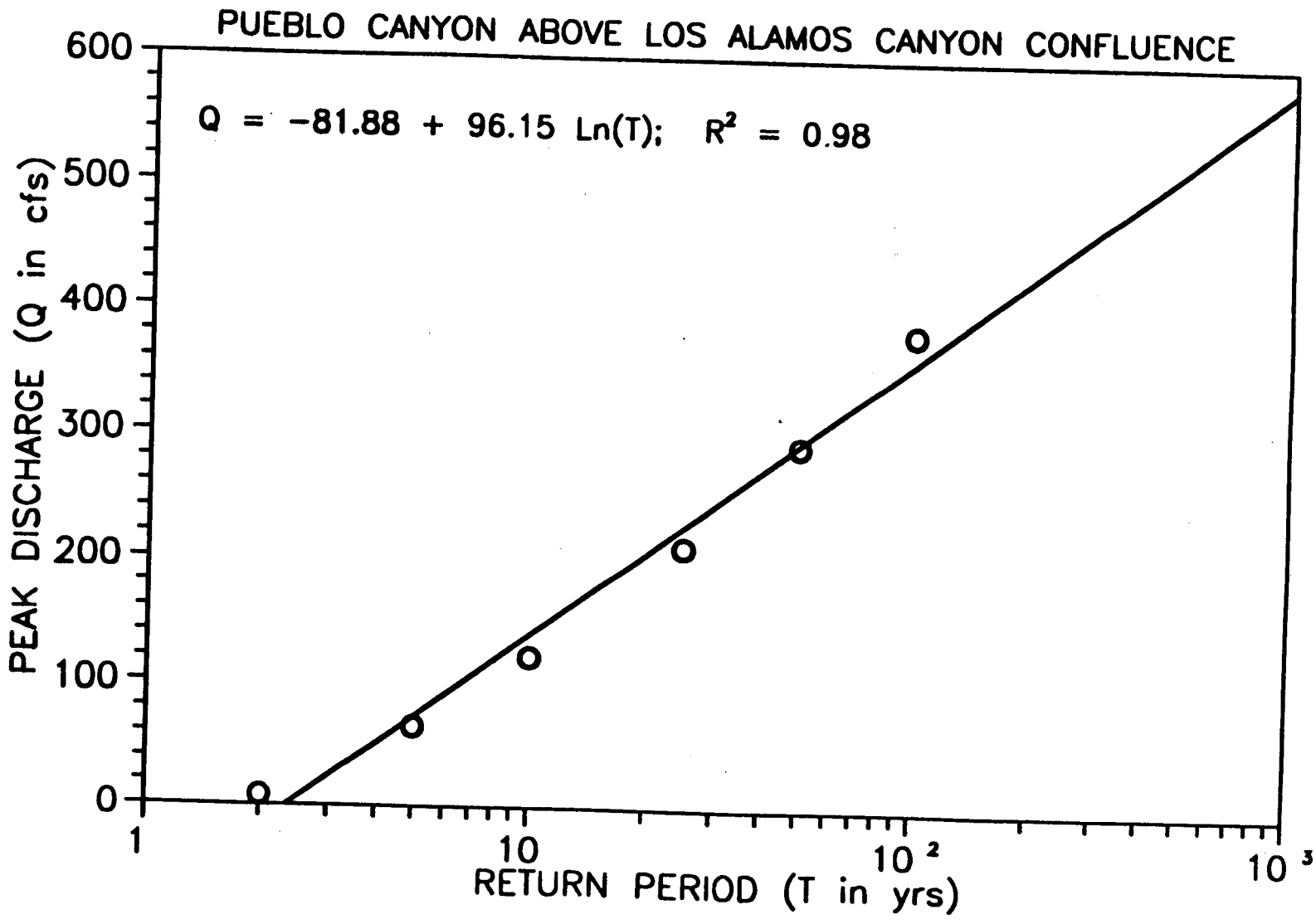
x	=	0.20
R(ft)	=	2.00
n	=	0.10
NMIN	=	15.00
1/[2(1-x)]	=	0.63
1/(2x)	=	2.50

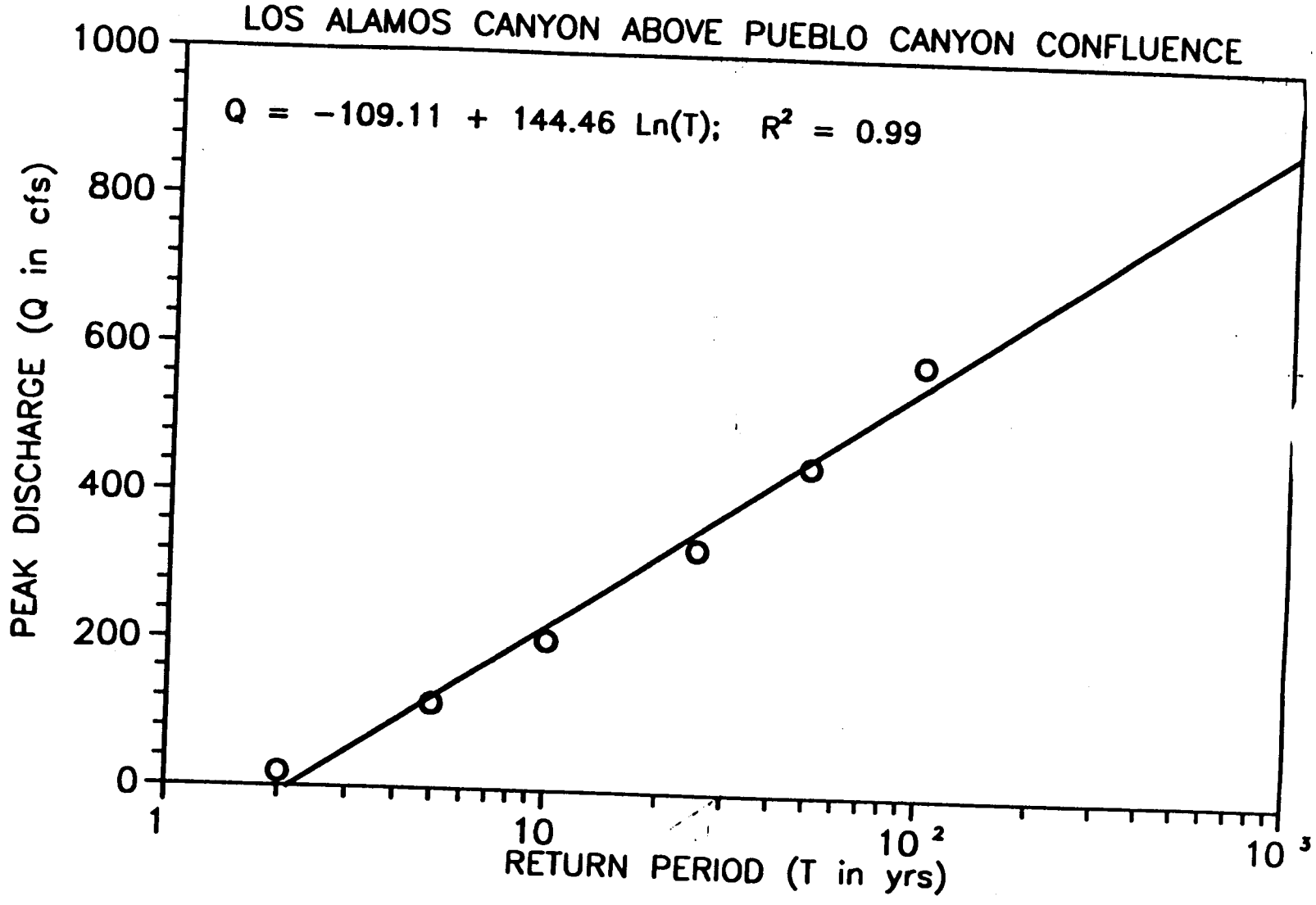
BASIN NO.	L (ft)	Vel	K	Nstps	NSTPS	CHECK	AMSKK
1	20200	8.3	0.67	2.70	3	0.90	0.67
2	24400	4.9	1.39	5.58	6	0.93	1.39
3	24000	3.8	1.74	6.94	7	0.99	1.74

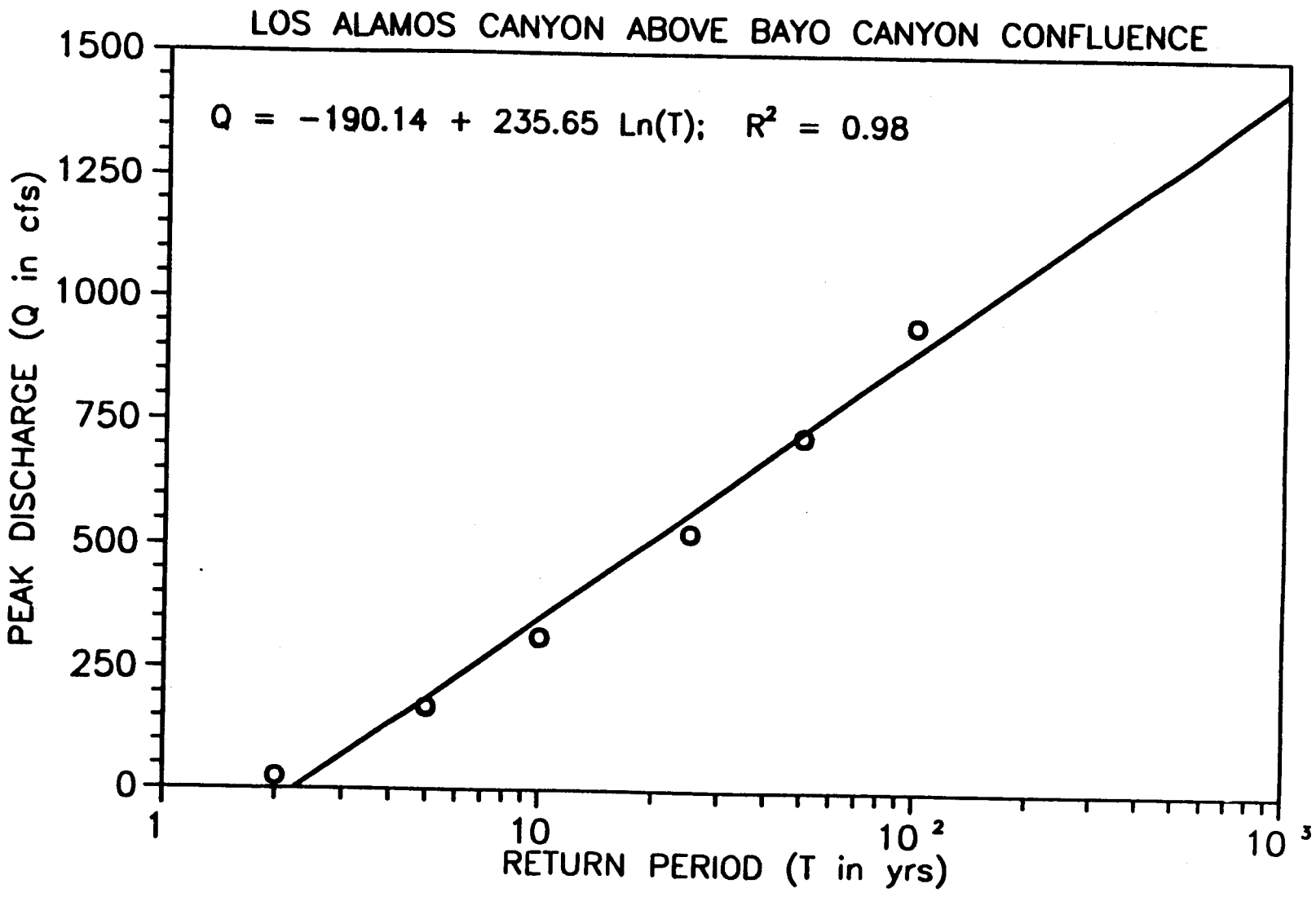

GUAJE CANYON ABOVE BARRANCAS CANYON CONFLUENCE
Q = −198.48 + 222.68 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
1500
1250
1000
750
500
250
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

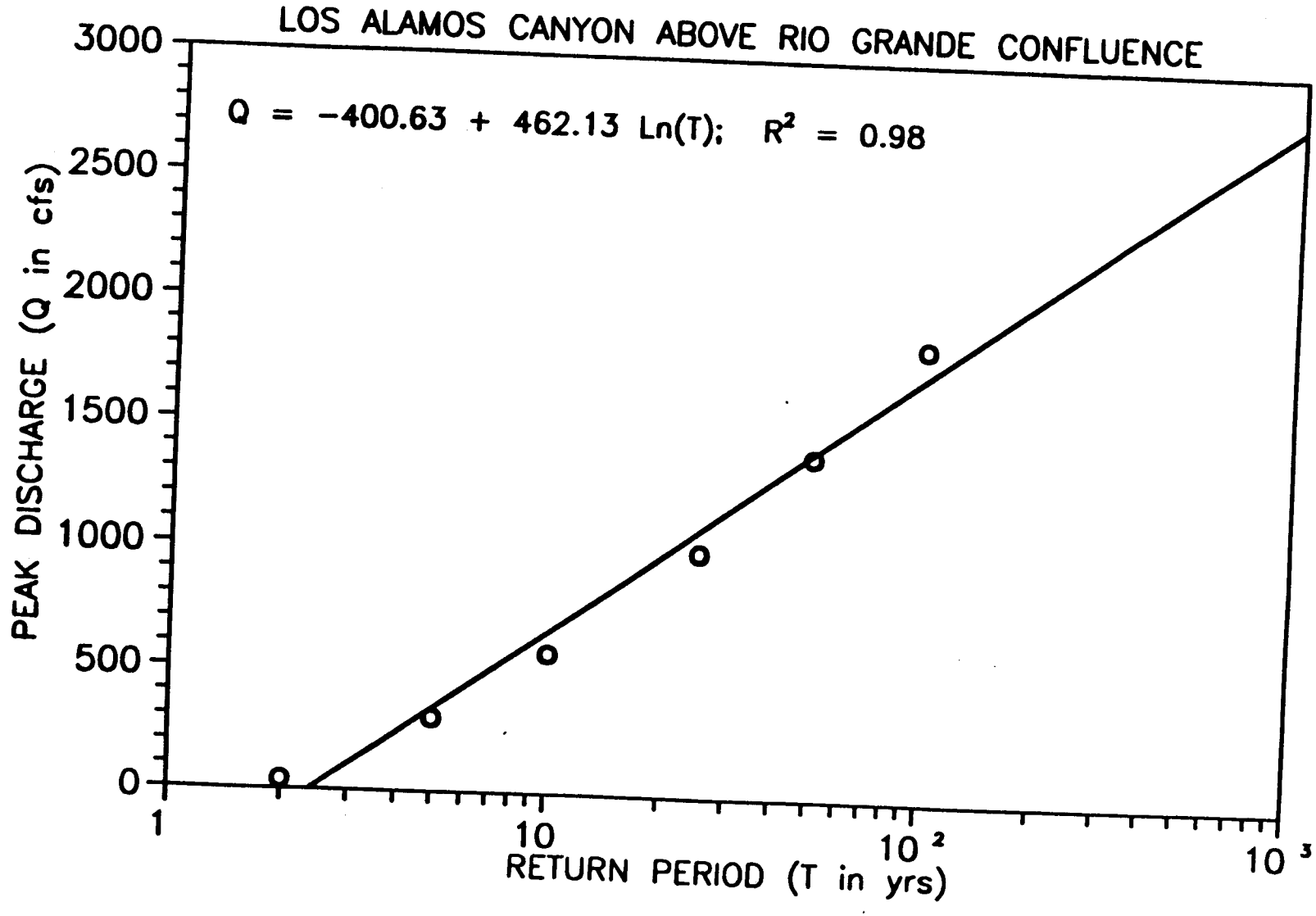

BARRANCAS CANYON ABOVE GUAJE CANYON CONFLUENCE
Q = −22.14 + 22.94 Ln(T); R² = 0.97
PEAK DISCHARGE (Q in cfs)
150
125
100
75
50
25
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

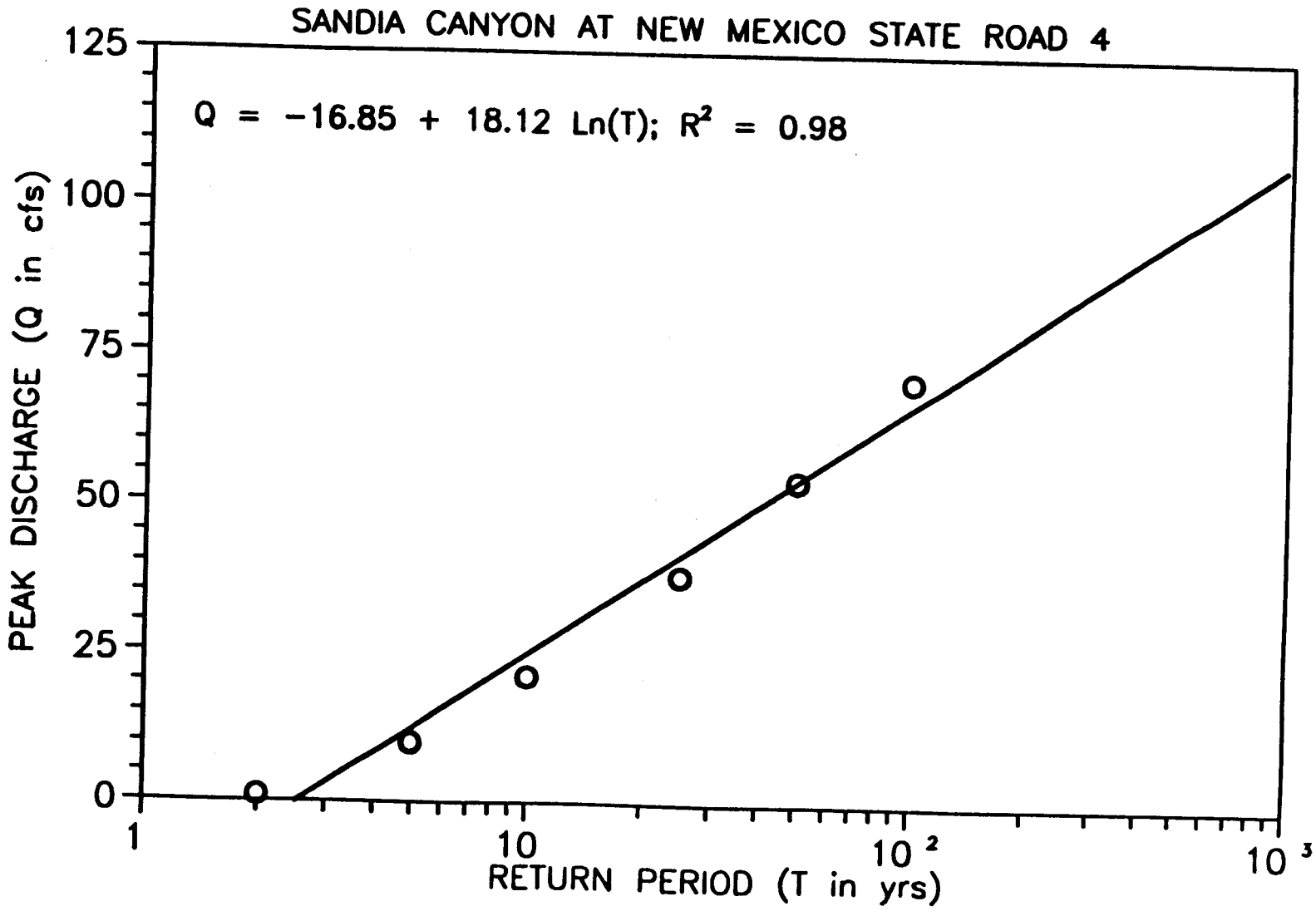

BAYO CANYON ABOVE LOS ALAMOS CANYON CONFLUENCE
Q = −34.81 + 37.44 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
250
200
150
100
50
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

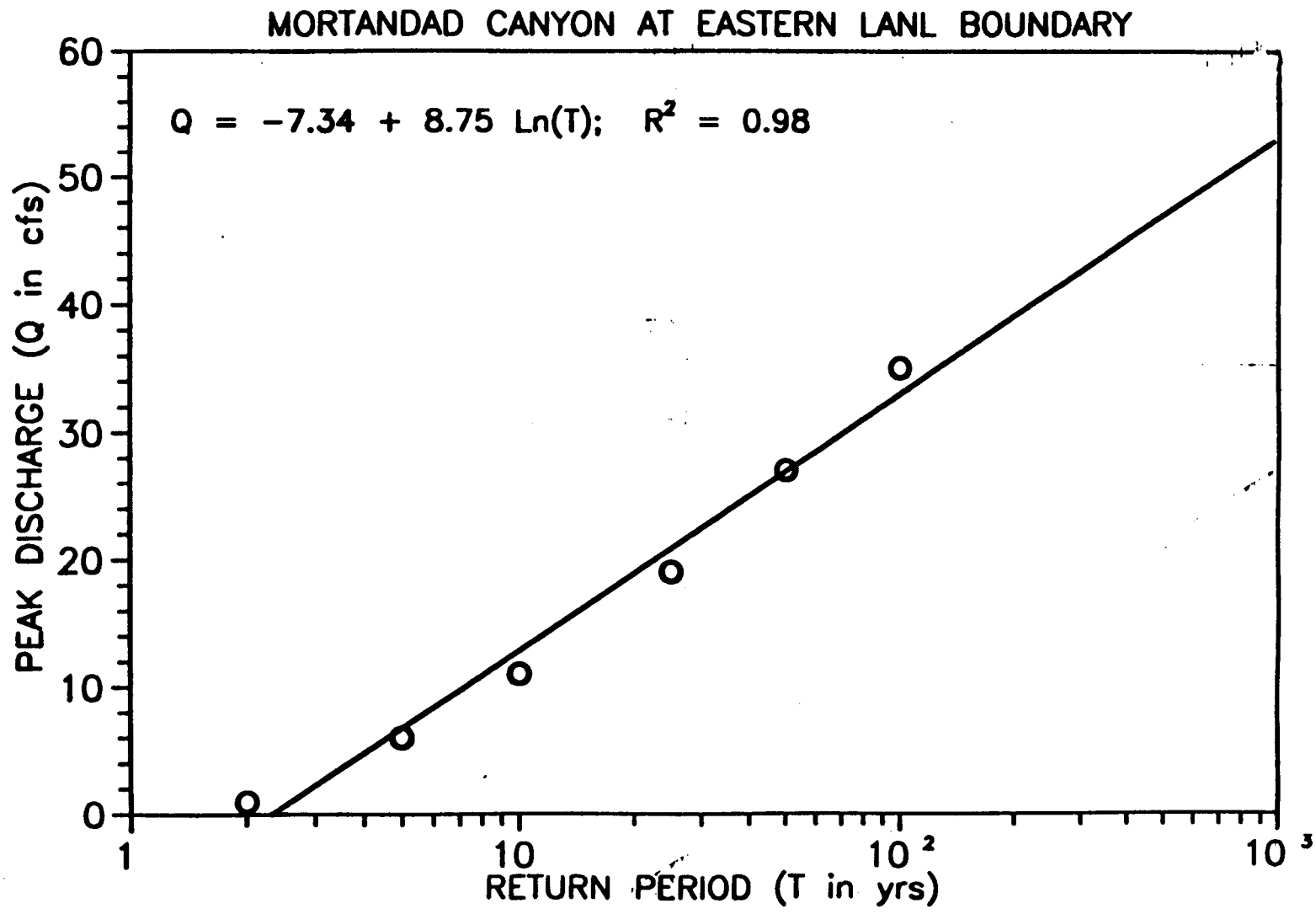

PUEBLO CANYON ABOVE LOS ALAMOS CANYON CONFLUENCE
Q = −81.88 + 96.15 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
600
500
400
300
200
100
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

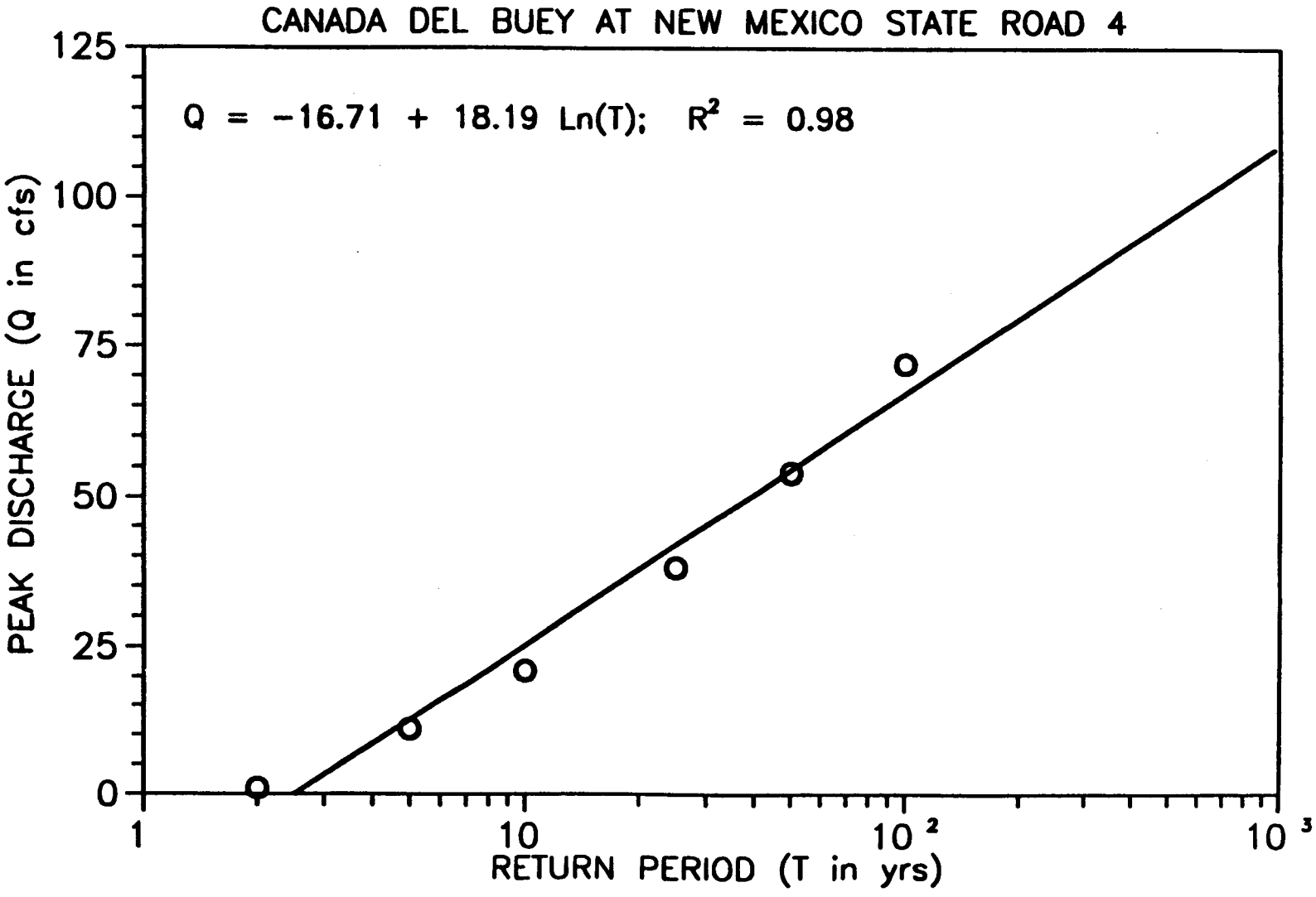

LOS ALAMOS CANYON ABOVE PUEBLO CANYON CONFLUENCE
Q = −109.11 + 144.46 Ln(T); R² = 0.99
PEAK DISCHARGE (Q in cfs)
1000
800
600
400
200
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

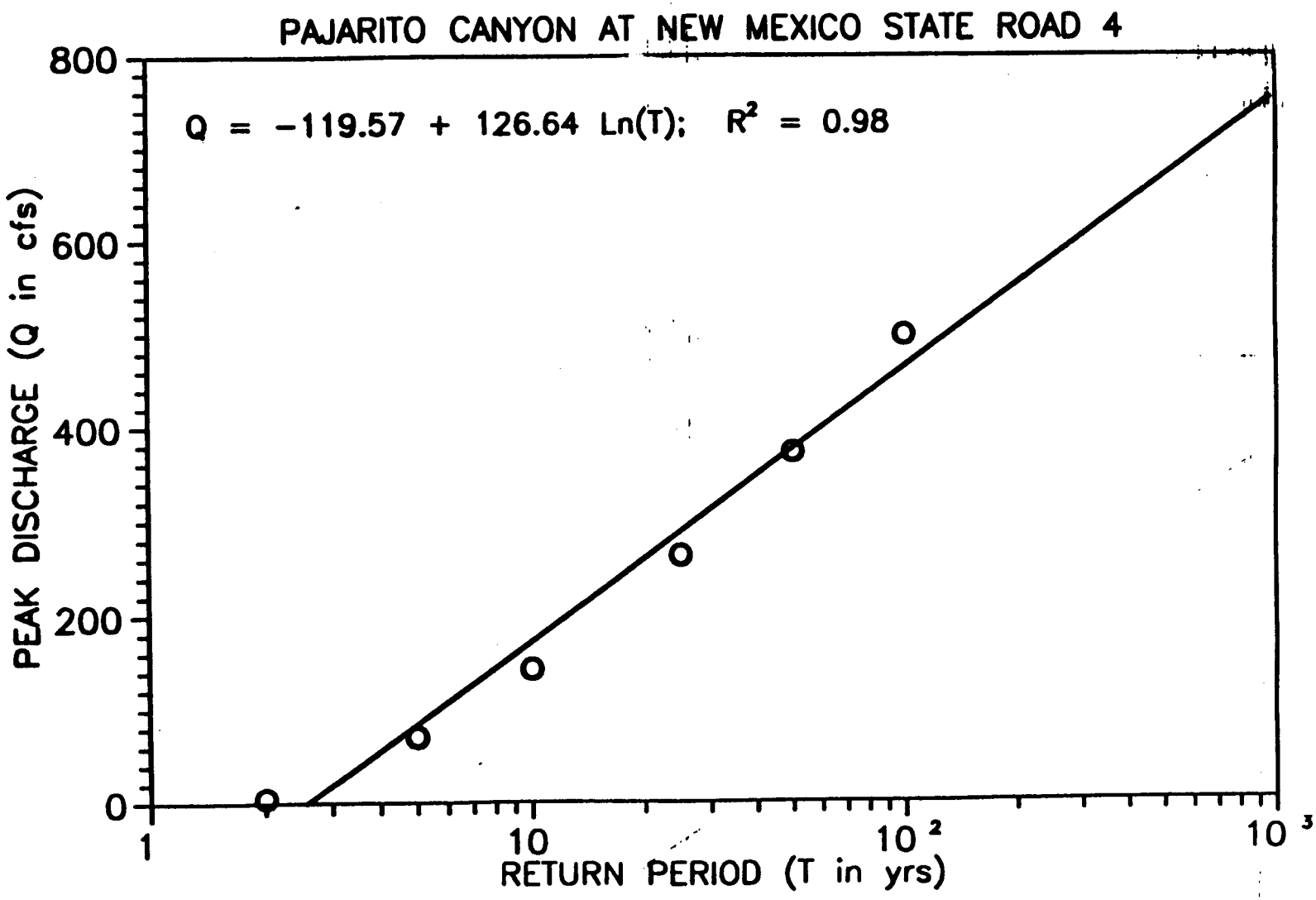

LOS ALAMOS CANYON ABOVE BAYO CANYON CONFLUENCE
Q = −190.14 + 235.65 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
1500
1250
1000
750
500
250
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

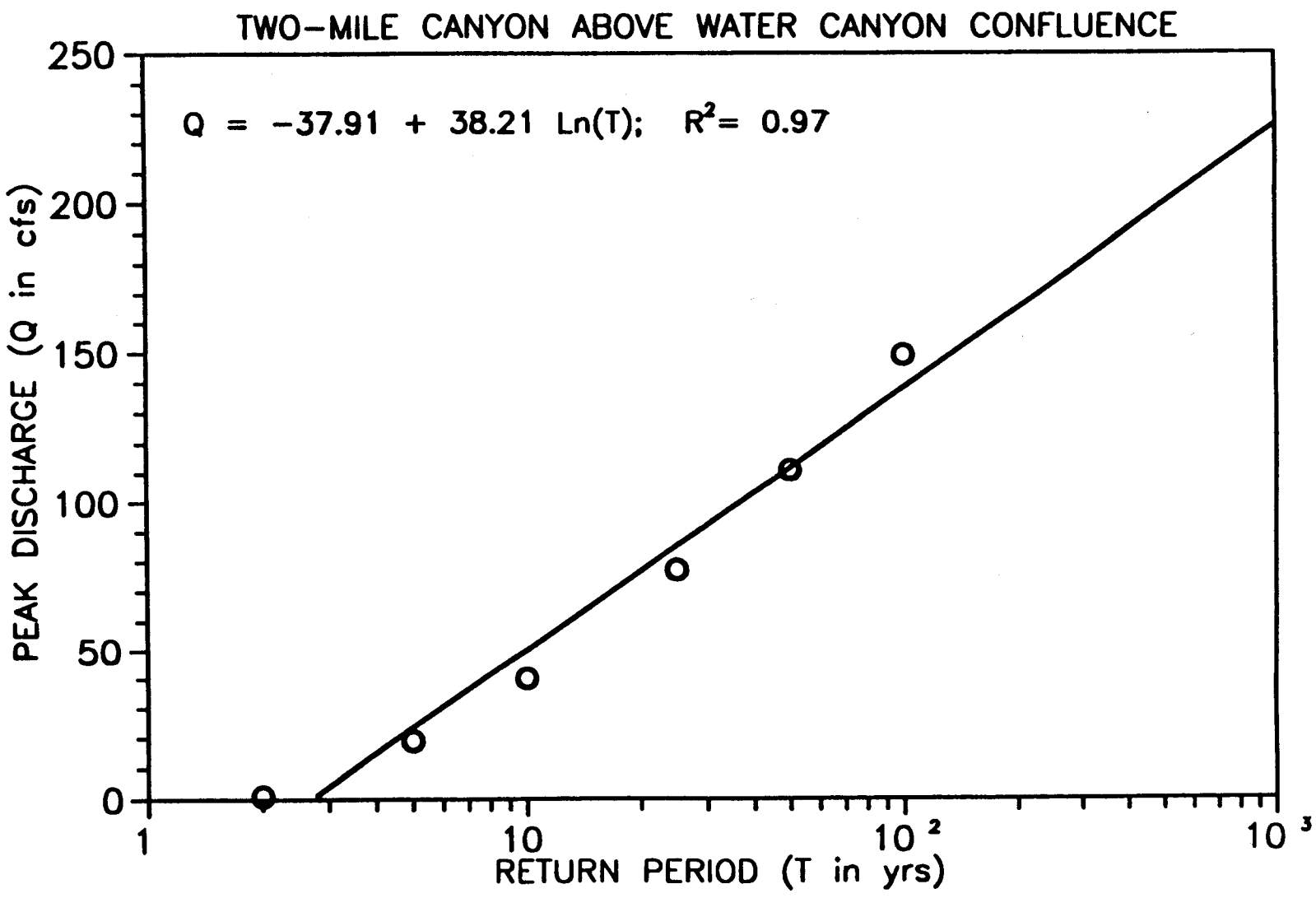

LOS ALAMOS CANYON ABOVE RIO GRANDE CONFLUENCE
Q = −400.63 + 462.13 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
3000
2500
2000
1500
1000
500
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

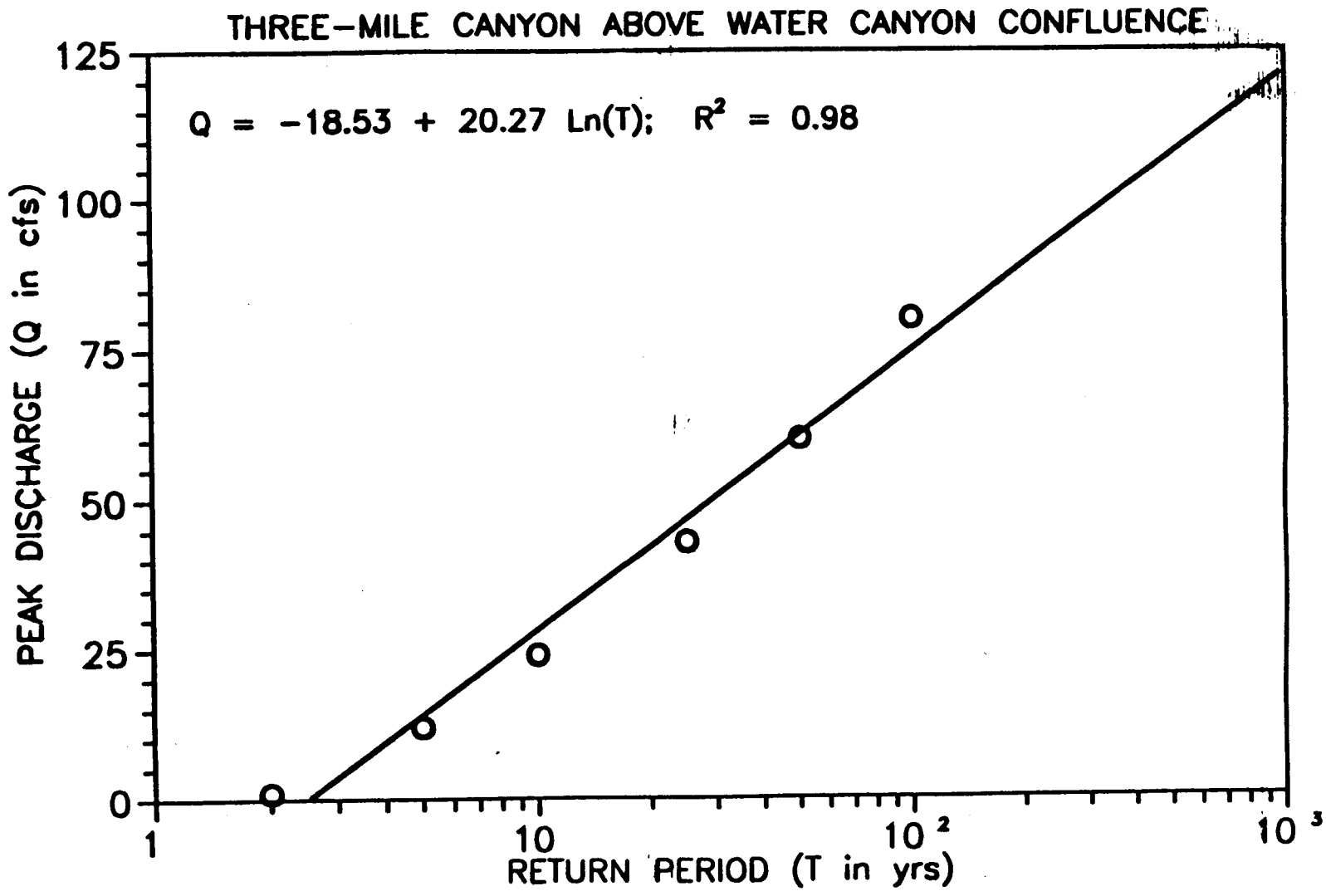

SANDIA CANYON AT NEW MEXICO STATE ROAD 4
Q = −16.85 + 18.12 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
125
100
75
50
25
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

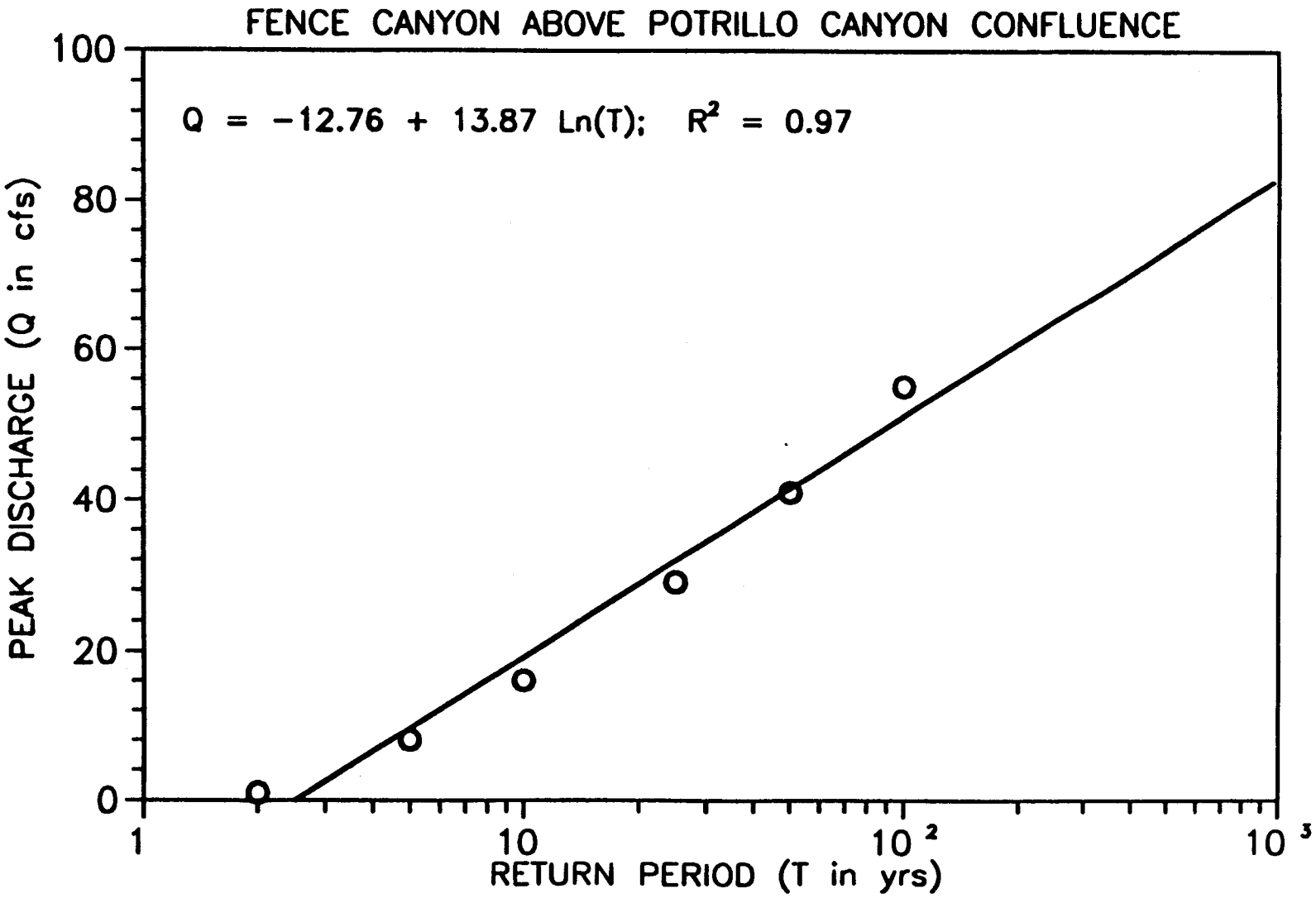

MORTANDAD CANYON AT EASTERN LANL BOUNDARY
Q = −7.34 + 8.75 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
0
10
20
30
40
50
60
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

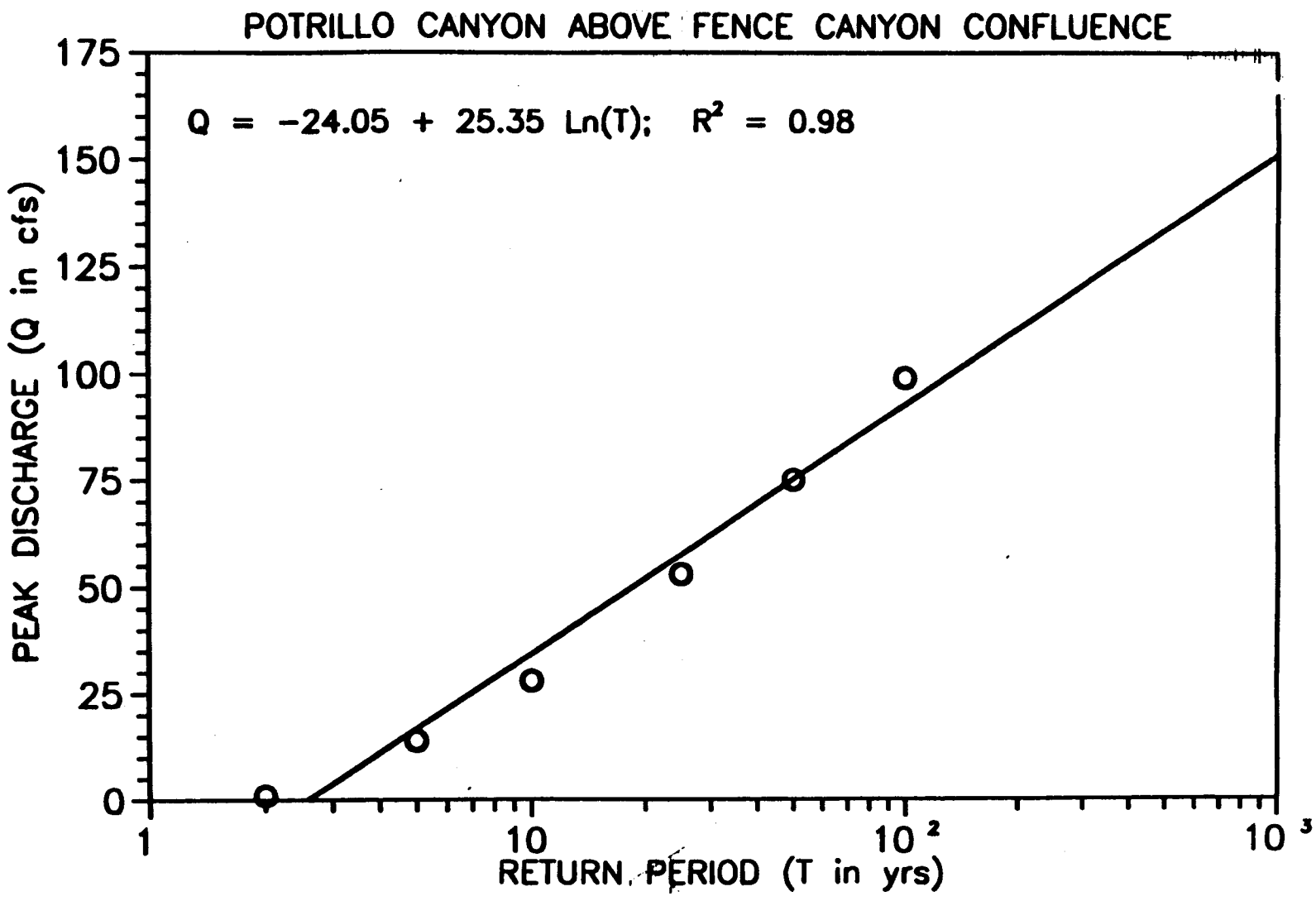

CANADA DEL BUEY AT NEW MEXICO STATE ROAD 4
Q = −16.71 + 18.19 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
125
100
75
50
25
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

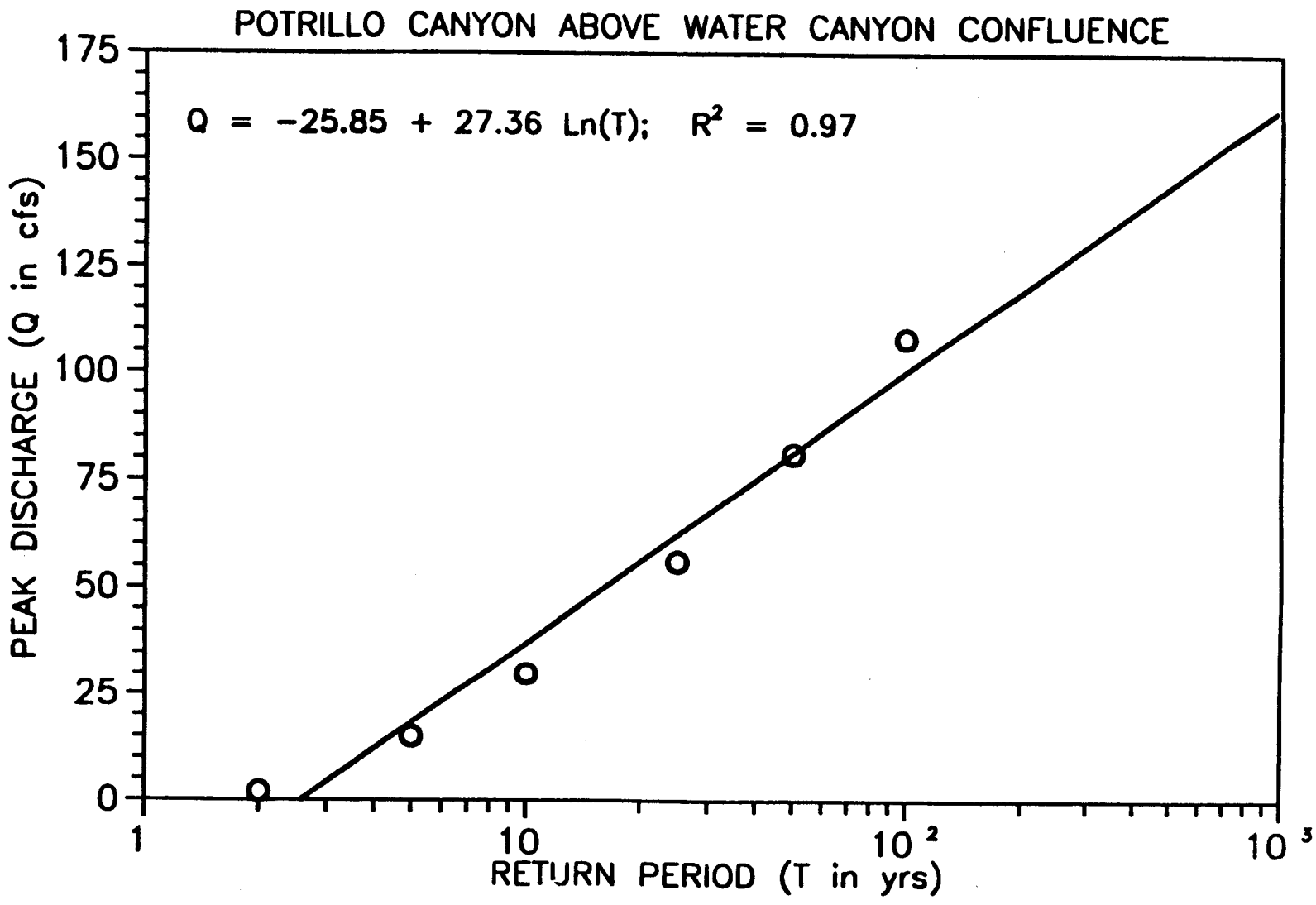

PAJARITO CANYON AT NEW MEXICO STATE ROAD 4
Q = −119.57 + 126.64 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
800
600
400
200
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

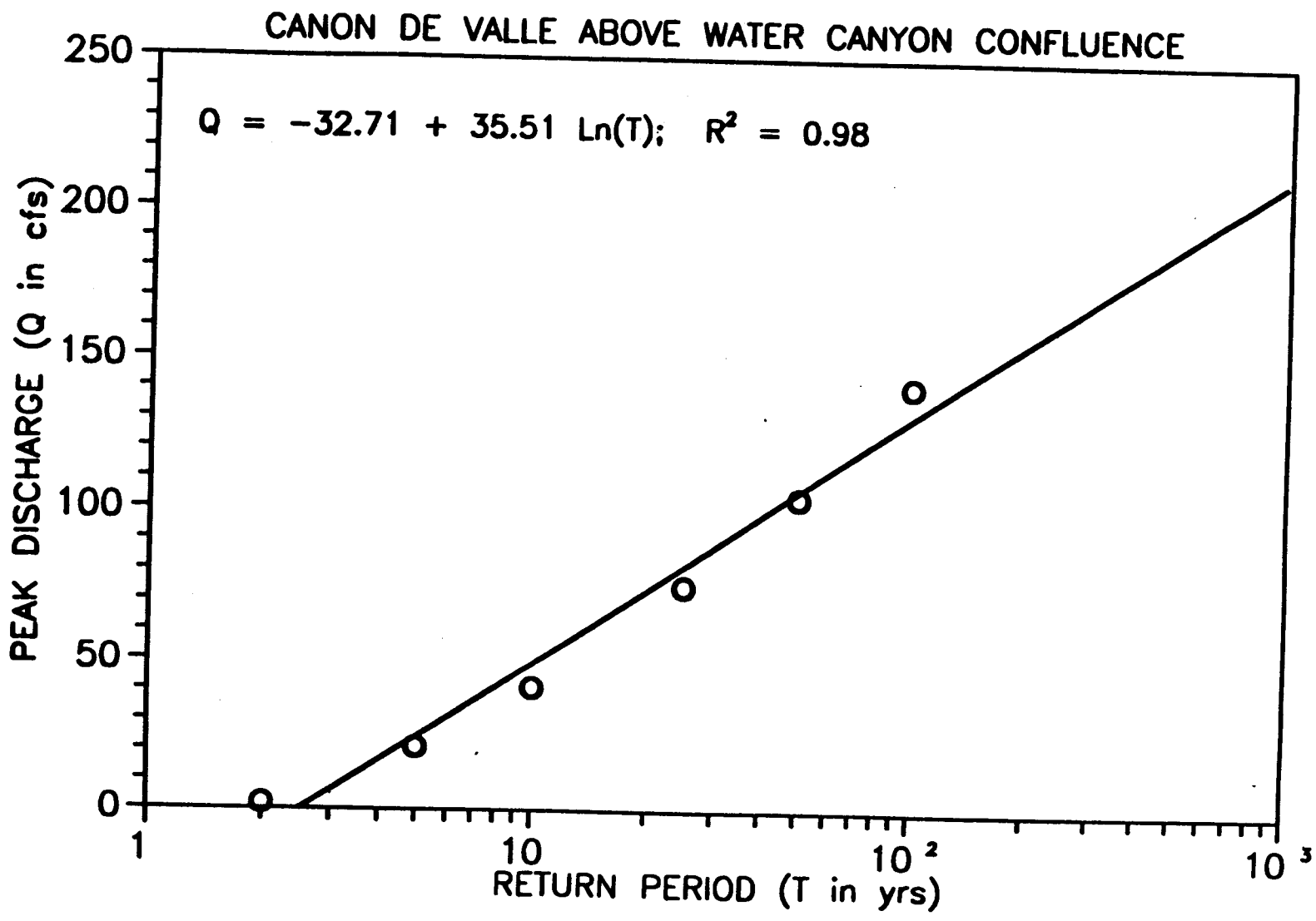

TWO-MILE CANYON ABOVE WATER CANYON CONFLUENCE
Q = -37.91 + 38.21 Ln(T); R² = 0.97
PEAK DISCHARGE (Q in cfs)
250
200
150
100
50
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

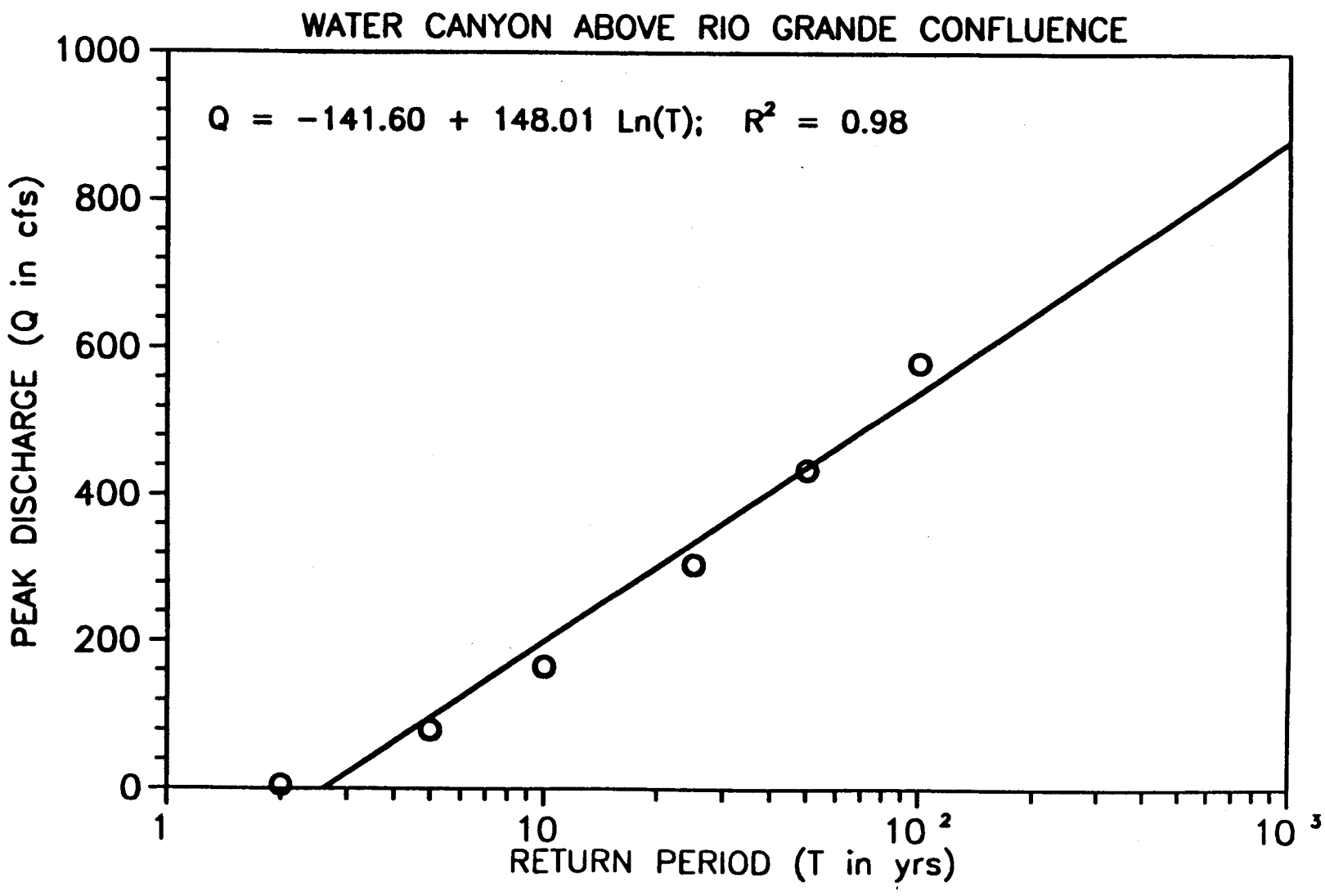

THREE-MILE CANYON ABOVE WATER CANYON CONFLUENCE
Q = -18.53 + 20.27 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
125
100
75
50
25
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

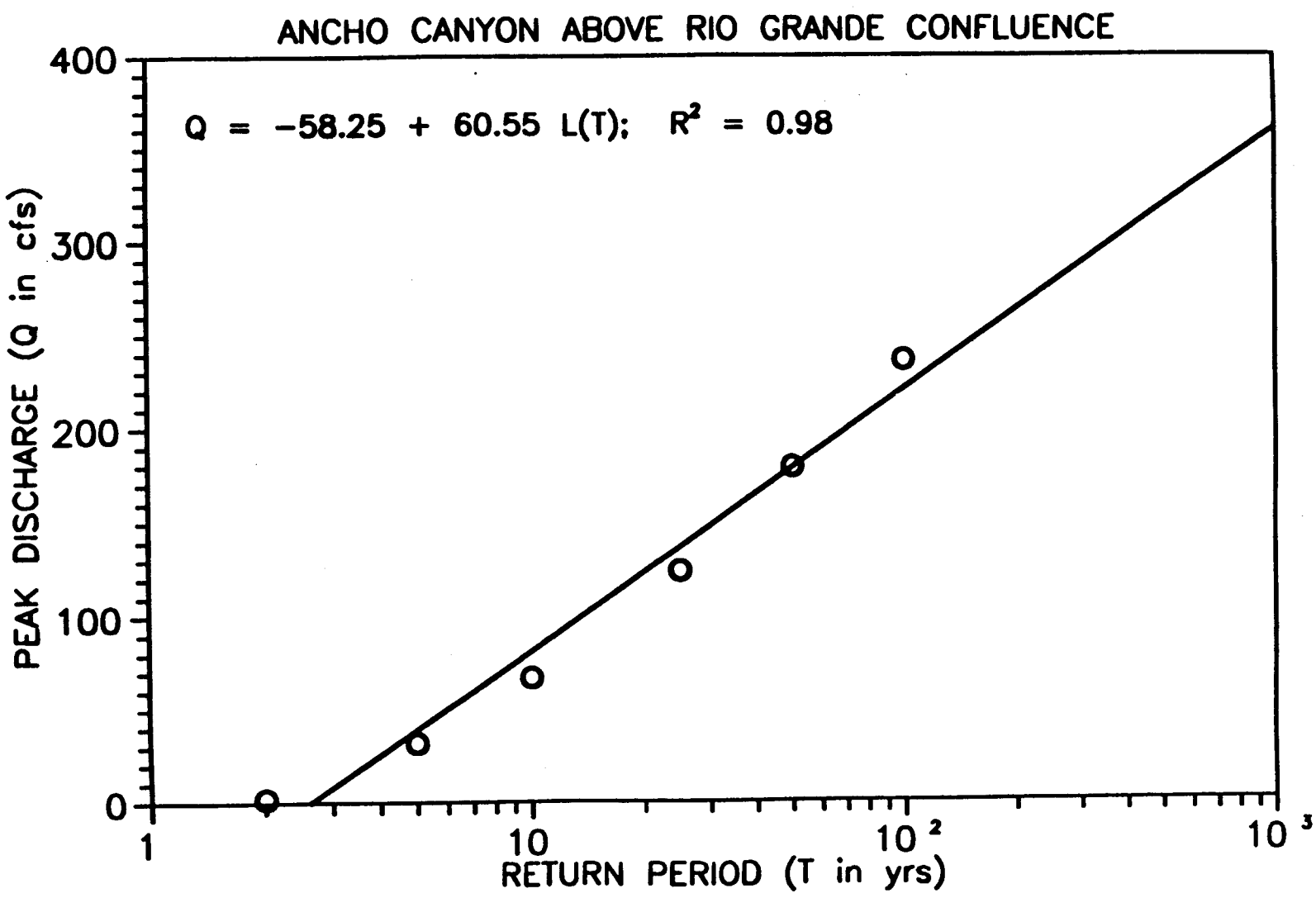

FENCE CANYON ABOVE POTRILLO CANYON CONFLUENCE
Q = −12.76 + 13.87 Ln(T); R² = 0.97
PEAK DISCHARGE (Q in cfs)
100
80
60
40
20
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

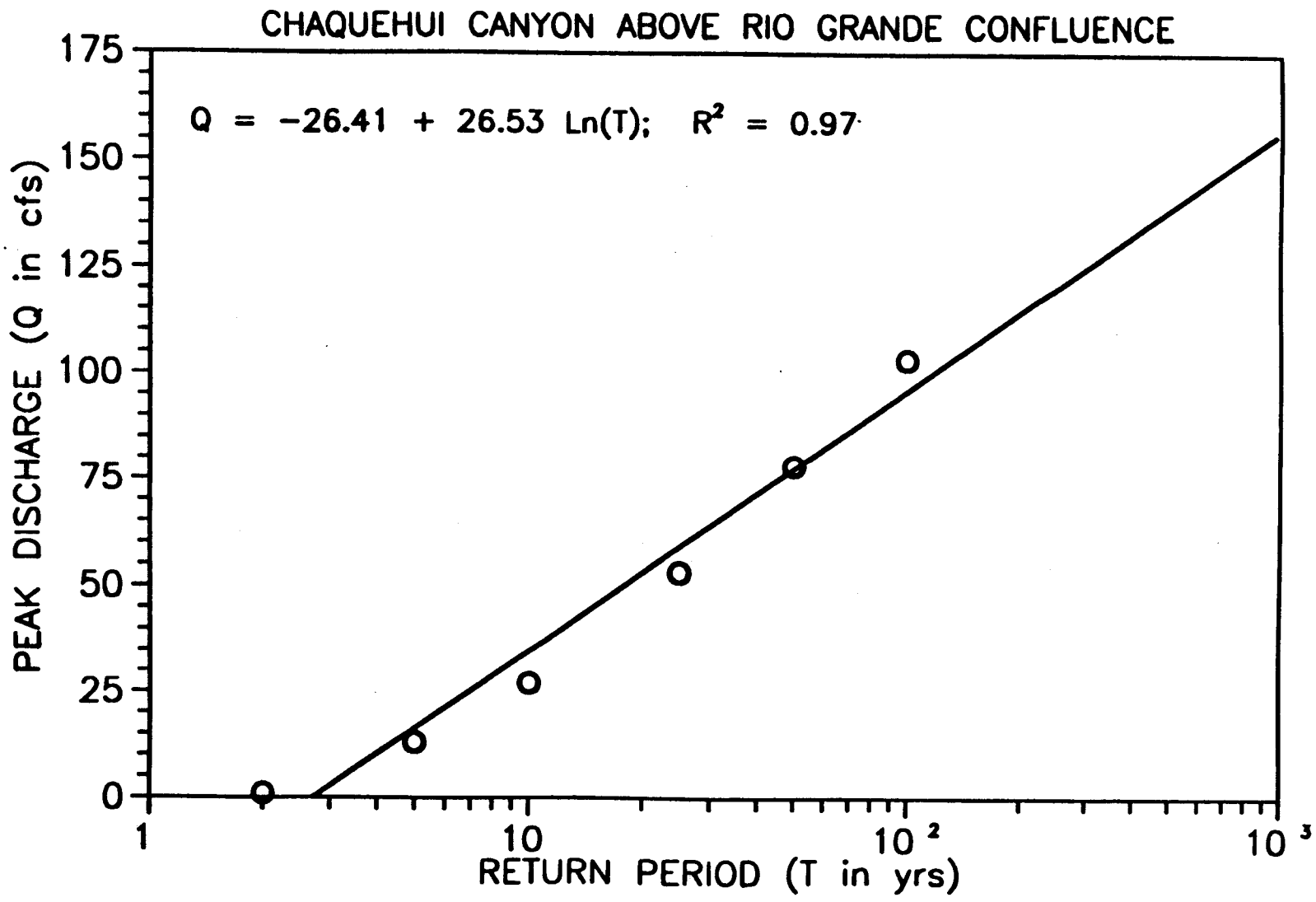

POTRILLO CANYON ABOVE FENCE CANYON CONFLUENCE
Q = −24.05 + 25.35 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
175
150
125
100
75
50
25
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

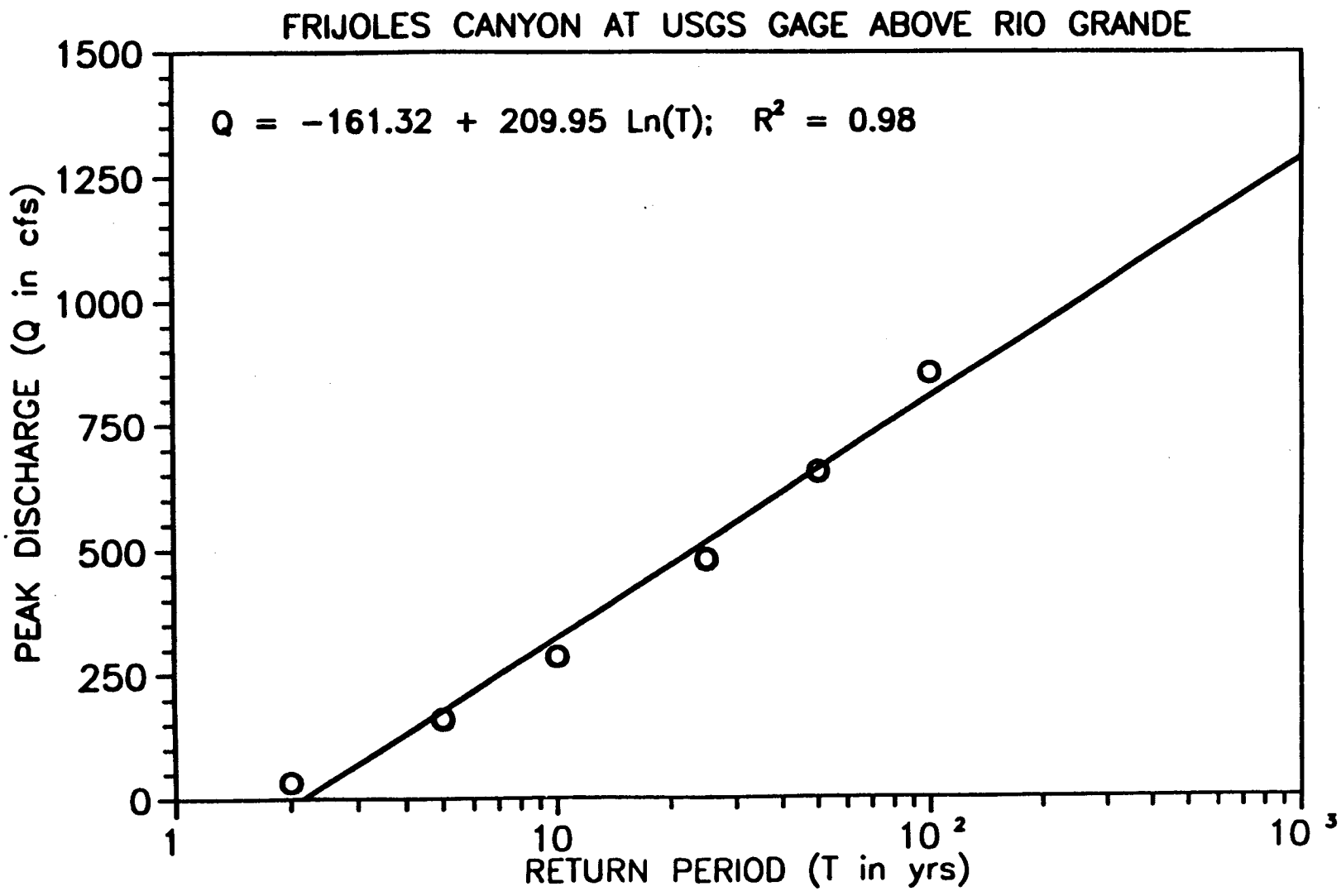

POTRILLO CANYON ABOVE WATER CANYON CONFLUENCE
Q = −25.85 + 27.36 Ln(T); R² = 0.97
PEAK DISCHARGE (Q in cfs)
175
150
125
100
75
50
25
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)


CANON DE VALLE ABOVE WATER CANYON CONFLUENCE
Q = −32.71 + 35.51 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
250
200
150
100
50
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)


WATER CANYON ABOVE RIO GRANDE CONFLUENCE
Q = −141.60 + 148.01 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
1000
800
600
400
200
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)


ANCHO CANYON ABOVE RIO GRANDE CONFLUENCE
Q = −58.25 + 60.55 L(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
400
300
200
100
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)


CHAQUEHUI CANYON ABOVE RIO GRANDE CONFLUENCE
Q = −26.41 + 26.53 Ln(T); R² = 0.97
PEAK DISCHARGE (Q in cfs)
175
150
125
100
75
50
25
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)


FRIJOLES CANYON AT USGS GAGE ABOVE RIO GRANDE
Q = −161.32 + 209.95 Ln(T); R² = 0.98
PEAK DISCHARGE (Q in cfs)
1500
1250
1000
750
500
250
0
1
10
10 ²
10 ³
RETURN PERIOD (T in yrs)

APPENDIX B

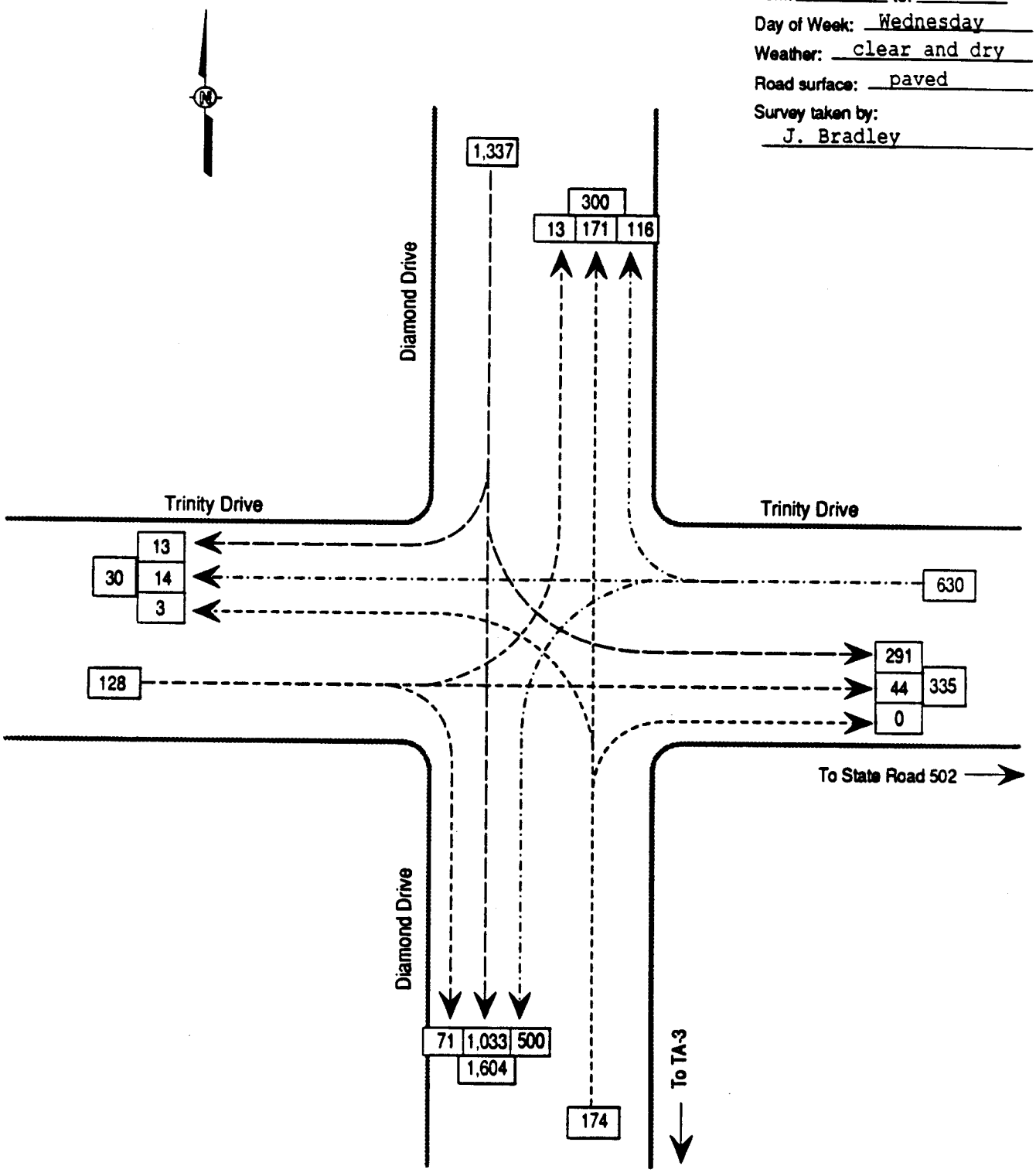
1991 and 1992 Traffic Studies at Intersection of Diamond Drive and Trinity Drive

301608.07 A1

LOS ALAMOS COUNTY
TRAFFIC ENGINEERING DEPARTMENT

Vehicular traffic count movements at the intersection of Diamond Drive and Trinity Drive.

Date of Survey: 10/2/91
Taken for 1 hour(s)
from: 07:15 to: 08:15
Day of Week: Wednesday
Weather: clear and dry
Road surface: paved
Survey taken by: J. Bradley



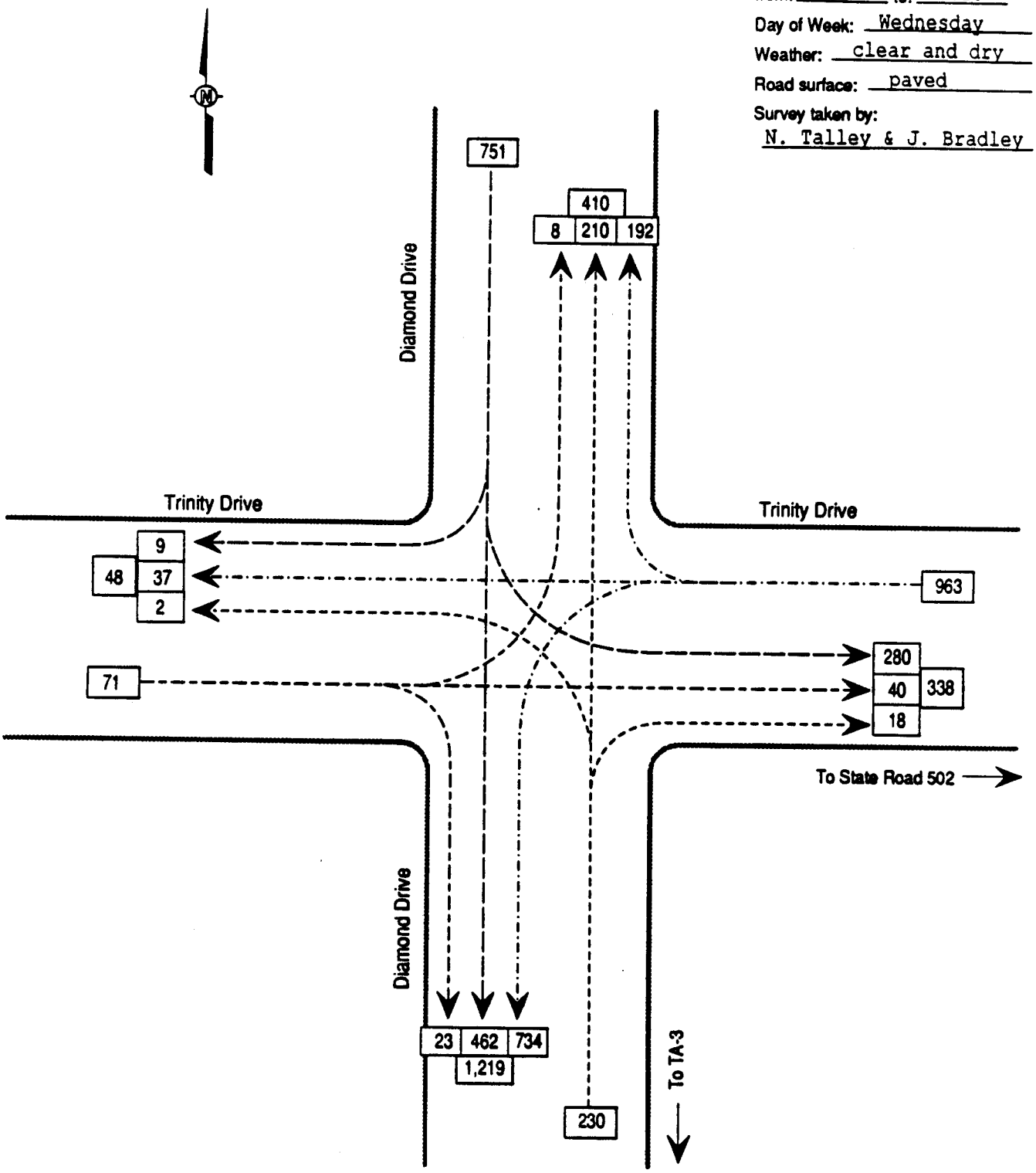
INTERNATIONAL TECHNOLOGY CORPORATION

301608.07 A2

LOS ALAMOS COUNTY
TRAFFIC ENGINEERING DEPARTMENT

Vehicular traffic count movements at the intersection of Diamond Drive and Trinity Drive.

Date of Survey: 10/2/91
Taken for 1 hour(s)
from: 12:20 to: 13:20
Day of Week: Wednesday
Weather: clear and dry
Road surface: paved
Survey taken by:
N. Talley & J. Bradley



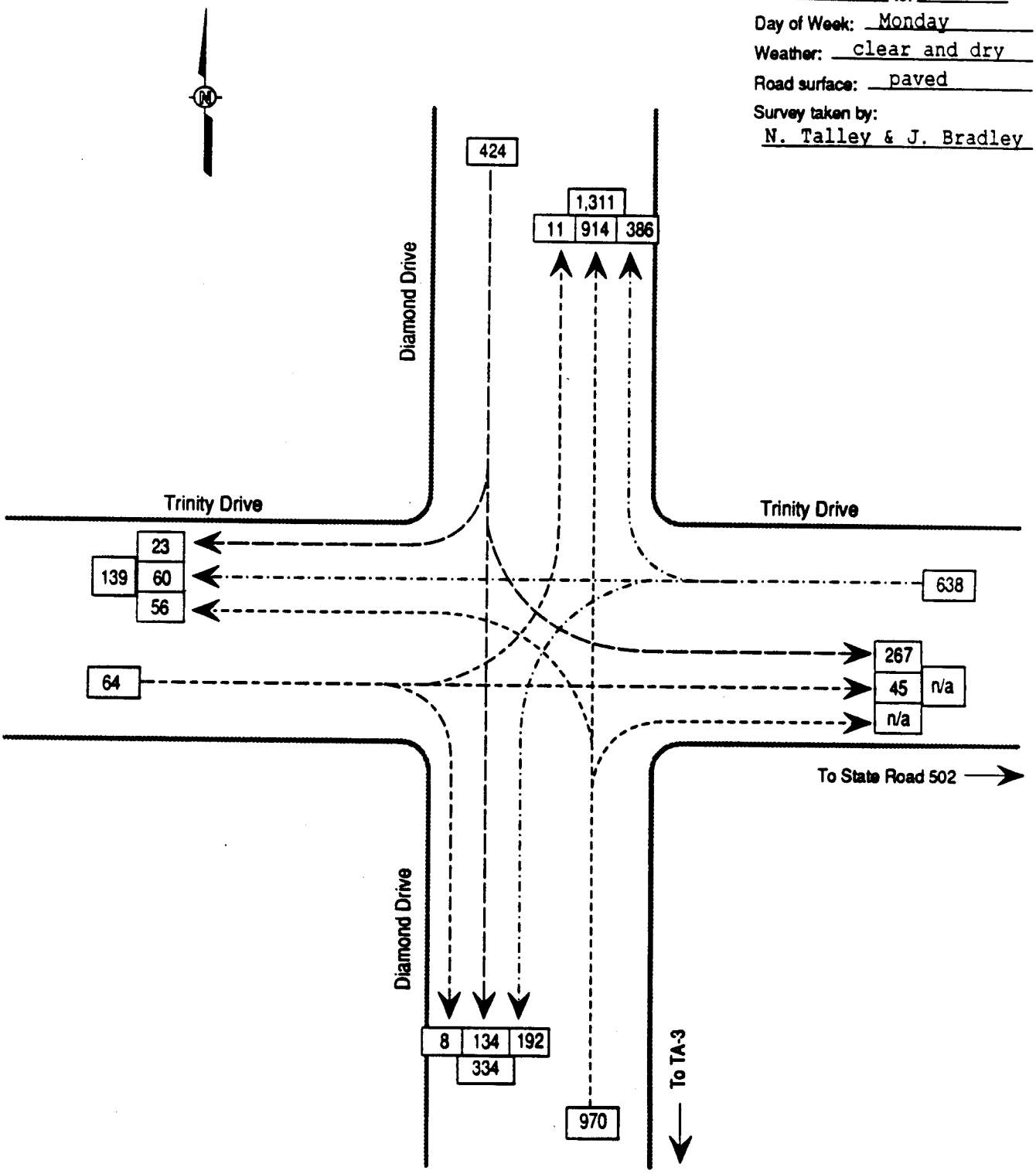
INTERNATIONAL TECHNOLOGY CORPORATION

301608.07 A3

LOS ALAMOS COUNTY
TRAFFIC ENGINEERING DEPARTMENT

Vehicular traffic count movements at the intersection of Diamond Drive and Trinity Drive.

Date of Survey: 10/7/91
Taken for 1 hour(s)
from: 16:25 to: 17:25
Day of Week: Monday
Weather: clear and dry
Road surface: paved
Survey taken by:
N. Talley & J. Bradley



INTERNATIONAL TECHNOLOGY CORPORATION

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNS.TXT
CHANNEL 1- NORTH BOUND
TAKEN BY - N. TALLEY

ROUTE - DIAMOND DRIVE
LOCATION - SOUTH OF TRINITY SIGNAL PRIOR TO WEST ROAD
CHANNEL 2- SOUTH BOUND
NOTE - COUNT INCLUDES DIAMOND TO TRINITY RAMP TRAFFIC

24 Hour Start Date

Daily Printout of 2 Channel Data

* NOT TO NM STATE TRAFFIC MONITORING STANDARDS

Tuesday September 29, 1992

Period Ends	North Bound	South Bound	Total	Hour Total
0:15	21	5	26	
0:30	7	2	9	
0:45	7	2	9	
1:00	7	6	13	57
1:15	5	4	9	
1:30	8	1	9	
1:45	3	5	8	
2:00	5	7	12	38
2:15	2	0	2	
2:30	1	7	8	
2:45	5	1	6	
3:00	4	1	5	21
3:15	8	1	9	
3:30	2	3	5	
3:45	2	2	4	
4:00	3	4	7	25
4:15	1	4	5	
4:30	3	4	7	
4:45	3	6	9	
5:00	1	9	10	31
5:15	8	7	15	
5:30	5	16	21	
5:45	7	15	22	
6:00	9	32	41	99
6:15	14	38	52	
6:30	16	56	72	
6:45	33	148	181	
7:00	48	258	306	611
7:15	70	308	378	
7:30	134	411	545	
7:45	126	449	575	
8:00	196	557	753	2251
8:15	135	542	677	
8:30	151	343	494	
8:45	109	265	374	
9:00	150	170	320	1865
9:15	112	172	284	
9:30	136	163	299	
9:45	118	142	260	
10:00	155	158	313	1156
10:15	136	136	272	
10:30	151	130	281	
10:45	122	128	250	
11:00	157	146	303	1106
11:15	199	154	353	
11:30	233	168	401	
11:45	365	162	527	
12:00	444	183	627	1908
12:15	470	189	659	
12:30	259	255	514	
12:45	194	355	549	
13:00	191	427	618	2340
13:15	192	341	533	
13:30	157	322	479	
13:45	163	261	424	
14:00	151	193	344	1780
14:15	95	179	274	
14:30	118	158	276	
14:45	222	146	368	
15:00	198	180	378	1296
15:15	181	133	314	
15:30	166	178	344	
15:45	317	148	465	
16:00	320	195	515	1638
16:15	480	160	640	
16:30	395	139	534	
16:45	417	138	555	
17:00	397	133	530	2259
17:15	546	164	710	
17:30	527	174	701	
17:45	388	174	562	
18:00	267	125	392	2365
18:15	237	116	353	
18:30	206	79	285	
18:45	137	82	219	
19:00	161	85	246	1103
19:15	100	83	183	
19:30	95	82	177	
19:45	131	97	228	
20:00	64	66	130	718
20:15	66	56	122	
20:30	57	54	111	
20:45	62	45	107	
21:00	38	53	91	431
21:15	37	46	83	
21:30	30	23	53	
21:45	31	35	66	
22:00	25	16	41	243
22:15	24	16	40	
22:30	23	24	47	
22:45	27	14	41	
23:00	17	17	34	162
23:15	24	8	32	
23:30	12	7	19	
23:45	33	10	43	
24:00	18	6	24	118
24 Hr Total	12103	11518	23621	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNS.TXT
CHANNEL 1- NORTH BOUND
TAKEN BY - N. TALLEY

ROUTE - DIAMOND DRIVE
LOCATION - SOUTH OF TRINITY SIGNAL PRIOR TO WEST ROAD
CHANNEL 2- SOUTH BOUND
NOTE - COUNT INCLUDES DIAMOND TO TRINITY RAMP TRAFFIC

24 Hour Start Date

Daily Printout of 2 Channel Data

Wednesday September 30, 1992

Period Ends	North Bound	South Bound	Total	Hour Total
0:15	8	1	9	
0:30	7	3	10	
0:45	6	5	11	
1:00	2	1	3	33
1:15	2	3	5	
1:30	0	2	2	
1:45	6	0	6	
2:00	1	1	2	15
2:15	5	3	8	
2:30	5	3	8	
2:45	0	0	0	
3:00	1	3	4	20
3:15	4	0	4	
3:30	1	0	1	
3:45	1	2	3	
4:00	2	6	8	16
4:15	0	4	4	
4:30	5	5	10	
4:45	2	6	8	
5:00	1	2	3	25
5:15	7	13	20	
5:30	4	17	21	
5:45	9	23	32	
6:00	14	39	53	126
6:15	10	44	54	
6:30	23	59	82	
6:45	43	130	173	
7:00	36	260	296	605
7:15	63	302	365	
7:30	122	395	517	
7:45	160	500	660	
8:00	162	529	691	2233
8:15	161	493	654	
8:30	149	335	484	
8:45	120	252	372	
9:00	142	207	349	1859
9:15	81	173	254	
9:30	105	171	276	
9:45	118	140	258	
10:00	126	149	275	1063
10:15	143	146	289	
10:30	119	118	237	
10:45	124	151	275	
11:00	178	141	319	1120
11:15	177	160	337	
11:30	247	137	384	
11:45	382	158	540	
12:00	458	184	642	1903
2:15	471	198	669	
12:30	279	270	549	
12:45	174	326	500	
13:00	51	443	494	2212
13:15	7	423	430	
13:30	2	293	295	
13:45	0	231	231	
14:00	172	188	360	1316
14:15	159	160	319	
14:30	172	174	346	
14:45	151	202	353	
15:00	170	191	361	1379
15:15	196	164	360	
15:30	175	152	327	
15:45	299	140	439	
16:00	294	151	445	1571
16:15	483	145	628	
16:30	426	166	592	
16:45	478	132	610	
17:00	402	150	552	2382
17:15	517	166	683	
17:30	455	165	620	
17:45	389	135	524	
18:00	257	123	380	2207
18:15	223	117	340	
18:30	184	97	281	
18:45	175	97	272	
19:00	149	90	239	1132
19:15	109	67	176	
19:30	68	88	156	
19:45	66	61	127	
20:00	68	55	123	582
20:15	63	52	115	
20:30	50	65	115	
20:45	58	71	129	
21:00	33	52	85	444
21:15	26	55	81	
21:30	41	43	84	
21:45	35	27	62	
22:00	30	34	64	291
22:15	27	23	50	
22:30	28	18	46	
22:45	20	27	47	
23:00	26	18	44	187
23:15	15	11	26	
23:30	17	13	30	
23:45	23	6	29	
24:00	21	7	28	113
24 Hr Total	11276	11558	22834	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNS.TXT
CHANNEL 1- NORTH BOUND
TAKEN BY - N. TALLEY

ROUTE - DIAMOND DRIVE
LOCATION - SOUTH OF TRINITY SIGNAL PRIOR TO WEST ROAD
CHANNEL 2- SOUTH BOUND
NOTE - COUNT INCLUDES DIAMOND TO TRINITY RAMP TRAFFIC

24 Hour Start Date

Daily Printout of 2 Channel Data

Thursday October 1, 1992

Period Ends	North Bound	South Bound	Total	Hour Total
0:15	10	8	18	
0:30	10	0	10	
0:45	6	3	9	
1:00	4	3	7	44
1:15	7	2	9	
1:30	5	3	8	
1:45	0	1	1	
2:00	1	0	1	19
2:15	1	1	2	
2:30	5	1	6	
2:45	1	0	1	
3:00	2	1	3	12
3:15	3	0	3	
3:30	3	0	3	
3:45	1	3	4	
4:00	1	3	4	14
4:15	4	6	10	
4:30	2	3	5	
4:45	3	5	8	
5:00	1	4	5	28
5:15	5	8	13	
5:30	1	8	9	
5:45	5	13	18	
6:00	10	28	38	78
6:15	16	51	67	
6:30	17	59	76	
6:45	29	112	141	
7:00	59	271	330	614
7:15	78	304	382	
7:30	130	425	555	
7:45	140	452	592	
8:00	162	539	701	2230
8:15	185	503	688	
8:30	141	340	481	
8:45	126	256	382	
9:00	152	217	369	1920
9:15	108	173	281	
9:30	125	178	303	
9:45	118	149	267	
10:00	154	173	327	1178
10:15	138	138	276	
10:30	148	141	289	
10:45	146	146	292	
11:00	174	144	318	1175
11:15	237	175	412	
11:30	246	174	420	
11:45	444	170	614	
12:00	473	183	656	2102
12:15	509	207	716	
12:30	294	259	553	
12:45	207	379	586	
13:00	186	477	663	2518
13:15	177	433	610	
13:30	186	315	501	
13:45	149	201	350	
14:00	145	179	324	1785
14:15	155	171	326	
14:30	191	149	340	
14:45	157	183	340	
15:00	182	162	344	1350
15:15	192	159	351	
15:30	170	144	314	
15:45	327	122	449	
16:00	298	204	502	1616
16:15	487	179	666	
16:30	411	165	576	
16:45	487	142	629	
17:00	390	131	521	2392
17:15	577	174	751	
17:30	453	203	656	
17:45	370	140	510	
18:00	266	141	407	2324
18:15	253	137	390	
18:30	172	111	283	
18:45	154	113	267	
19:00	139	97	236	1176
19:15	109	84	193	
19:30	84	79	163	
19:45	91	63	154	
20:00	54	61	115	625
20:15	64	57	121	
20:30	37	44	81	
20:45	35	38	73	
21:00	57	44	101	376
21:15	45	56	101	
21:30	40	33	73	
21:45	33	33	66	
22:00	32	34	66	306
22:15	40	31	71	
22:30	28	20	48	
22:45	18	20	38	
23:00	20	11	31	188
23:15	15	12	27	
23:30	15	7	22	
23:45	33	8	41	
24:00	16	8	24	114
24 Hr Total	12387	11797	24184	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNN.TXT
CHANNEL 1- SOUTH BOUND
TAKEN BY - N. TALLEY

ROUTE - DIAMOND DRIVE
LOCATION - NORTH OF TRINITY SIGNAL PRIOR TO CANYON SIGNAL
CHANNEL 2- NORTH BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

* NOT TO NM STATE TRAFFIC MONITORING STANDARDS

Saturday September 26, 1992

Period Ends	South Bound	North Bound	Total	Hour Total
0:15	11	19	30	
0:30	8	16	24	
0:45	12	17	29	
1:00	3	14	17	100
1:15	6	15	21	
1:30	2	15	17	
1:45	6	11	17	
2:00	5	10	15	70
2:15	2	5	7	
2:30	3	4	7	
2:45	0	7	7	
3:00	2	0	2	23
3:15	1	1	2	
3:30	3	0	3	
3:45	1	2	3	
4:00	6	4	10	18
4:15	0	1	1	
4:30	3	1	4	
4:45	3	4	7	
5:00	5	1	6	18
5:15	3	1	4	
5:30	7	7	14	
5:45	17	4	21	
6:00	17	4	21	60
6:15	18	9	27	
6:30	17	11	28	
6:45	24	5	29	
7:00	48	11	59	143
7:15	47	17	64	
7:30	51	31	82	
7:45	51	27	78	
8:00	79	42	121	345
8:15	69	37	106	
8:30	79	45	124	
8:45	82	36	118	
9:00	113	64	177	525
9:15	123	56	179	
9:30	107	71	178	
9:45	100	54	154	
10:00	131	74	205	716
10:15	114	75	189	
10:30	132	95	227	
10:45	130	89	219	
11:00	129	89	218	853
11:15	131	89	220	
11:30	127	115	242	
11:45	139	125	264	
12:00	112	124	236	962
12:15	132	116	248	
12:30	114	103	217	
12:45	113	97	210	
13:00	151	92	243	918
13:15	113	103	216	
13:30	117	93	210	
13:45	112	102	214	
14:00	106	86	192	832
14:15	110	88	198	
14:30	137	84	221	
14:45	140	107	247	
15:00	105	93	198	864
15:15	87	83	170	
15:30	93	124	217	
15:45	126	87	213	
16:00	95	74	169	769
16:15	97	89	186	
16:30	92	110	202	
16:45	92	101	193	
17:00	100	105	205	786
17:15	73	94	167	
17:30	89	118	207	
17:45	92	98	190	
18:00	82	88	170	734
18:15	79	96	175	
18:30	75	95	170	
18:45	78	91	169	
19:00	66	97	163	677
19:15	63	86	149	
19:30	55	85	140	
19:45	55	73	128	
20:00	56	74	130	547
20:15	45	63	108	
20:30	29	62	91	
20:45	54	62	116	
21:00	43	50	93	408
21:15	38	60	98	
21:30	36	51	87	
21:45	38	51	89	
22:00	33	52	85	359
22:15	23	67	90	
22:30	22	49	71	
22:45	32	67	99	
23:00	23	51	74	334
23:15	32	39	71	
23:30	23	25	48	
23:45	23	28	51	
24:00	33	28	61	231
24 Hr Total	5901	5391	11292	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNN.TXT
CHANNEL 1- SOUTH BOUND
TAKEN BY - N. TALLEY

ROUTE - DIAMOND DRIVE
LOCATION - NORTH OF TRINITY SIGNAL PRIOR TO CANYON SIGNAL
CHANNEL 2- NORTH BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Sunday September 27, 1992

Period Ends	South Bound	North Bound	Total	Hour Total
0:15	66	26	92	
0:30	32	25	57	
0:45	14	15	29	
1:00	15	11	26	204
1:15	9	10	19	
1:30	9	12	21	
1:45	9	8	17	
2:00	7	11	18	75
2:15	9	6	15	
2:30	5	8	13	
2:45	3	17	20	
3:00	6	4	10	58
3:15	8	1	9	
3:30	2	6	8	
3:45	2	6	8	
4:00	5	1	6	31
4:15	2	6	8	
4:30	3	4	7	
4:45	4	2	6	
5:00	2	3	5	26
5:15	4	2	6	
5:30	3	0	3	
5:45	9	4	13	
6:00	9	2	11	33
6:15	6	4	10	
6:30	17	12	29	
6:45	18	2	20	
7:00	21	8	29	88
7:15	11	13	24	
7:30	21	15	36	
7:45	45	24	69	
8:00	34	29	63	192
8:15	35	34	69	
8:30	53	33	86	
8:45	68	57	125	
9:00	81	112	193	473
9:15	85	73	158	
9:30	83	71	154	
9:45	74	70	144	
10:00	103	60	163	619
10:15	85	60	145	
10:30	80	53	133	
10:45	88	59	147	
11:00	87	72	159	584
11:15	86	74	160	
11:30	111	71	182	
11:45	112	73	185	
12:00	112	73	185	712
2:15	113	77	190	
12:30	126	92	218	
12:45	105	76	181	
13:00	89	80	169	758
13:15	97	81	178	
13:30	106	91	197	
13:45	109	66	175	
14:00	99	81	180	730
14:15	101	91	192	
14:30	108	84	192	
14:45	89	77	166	
15:00	105	79	184	734
15:15	85	87	172	
15:30	86	60	146	
15:45	73	76	149	
16:00	89	106	195	662
16:15	82	90	172	
16:30	90	96	186	
16:45	75	72	147	
17:00	77	87	164	669
17:15	58	103	161	
17:30	73	98	171	
17:45	72	86	158	
18:00	94	105	199	689
18:15	86	86	172	
18:30	53	76	129	
18:45	65	79	144	
19:00	60	104	164	609
19:15	66	74	140	
19:30	50	70	120	
19:45	60	57	117	
20:00	49	82	131	508
20:15	35	74	109	
20:30	30	33	63	
20:45	25	66	91	
21:00	26	34	60	323
21:15	26	32	58	
21:30	25	33	58	
21:45	19	22	41	
22:00	13	28	41	198
22:15	23	37	60	
22:30	6	11	17	
22:45	11	24	35	
23:00	10	17	27	139
23:15	3	14	17	
23:30	9	12	21	
23:45	3	13	16	
24:00	4	8	12	66
24 Hr Total	4711	4469	9180	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNN.TXT
CHANNEL 1- SOUTH BOUND
TAKEN BY - N. TALLEY

ROUTE - DIAMOND DRIVE
LOCATION - NORTH OF TRINITY SIGNAL PRIOR TO CANYON SIGNAL
CHANNEL 2- NORTH BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Monday September 28, 1992

Period Ends	South Bound	North Bound	Total	Hour Total
0:15	3	6	9	
0:30	5	4	9	
0:45	3	5	8	
1:00	4	3	7	33
1:15	1	2	3	
1:30	0	6	6	
1:45	2	7	9	
2:00	2	3	5	23
2:15	0	1	1	
2:30	2	6	8	
2:45	1	3	4	
3:00	2	1	3	16
3:15	0	2	2	
3:30	3	1	4	
3:45	6	1	7	
4:00	3	1	4	17
4:15	4	0	4	
4:30	5	1	6	
4:45	4	4	8	
5:00	4	5	9	27
5:15	5	2	7	
5:30	12	1	13	
5:45	17	1	18	
6:00	33	13	46	84
6:15	28	7	35	
6:30	66	21	87	
6:45	89	20	109	
7:00	185	41	226	457
7:15	218	71	289	
7:30	313	127	440	
7:45	390	121	511	
8:00	437	158	595	1835
8:15	372	133	505	
8:30	272	89	361	
8:45	169	88	257	
9:00	179	116	295	1418
9:15	130	73	203	
9:30	126	66	192	
9:45	93	75	168	
10:00	104	89	193	756
10:15	115	78	193	
10:30	87	85	172	
10:45	92	86	178	
11:00	113	125	238	781
11:15	94	99	193	
11:30	87	112	199	
11:45	160	138	298	
12:00	152	222	374	1064
2:15	132	233	365	
12:30	155	161	316	
12:45	212	118	330	
13:00	230	127	357	1368
13:15	217	114	331	
13:30	164	135	299	
13:45	159	95	254	
14:00	116	107	223	1107
14:15	125	92	217	
14:30	108	82	190	
14:45	120	121	241	
15:00	149	151	300	948
15:15	121	138	259	
15:30	119	114	233	
15:45	140	142	282	
16:00	196	137	333	1107
16:15	164	223	387	
16:30	125	215	340	
16:45	113	265	378	
17:00	111	263	374	1479
17:15	147	372	519	
17:30	157	399	556	
17:45	178	261	439	
18:00	106	216	322	1836
18:15	96	199	295	
18:30	81	167	248	
18:45	112	128	240	
19:00	116	128	244	1027
19:15	96	101	197	
19:30	88	112	200	
19:45	70	61	131	
20:00	40	77	117	645
20:15	74	60	134	
20:30	57	58	115	
20:45	37	38	75	
21:00	39	47	86	410
21:15	65	33	98	
21:30	39	40	79	
21:45	27	47	74	
22:00	29	34	63	314
22:15	15	38	53	
22:30	14	32	46	
22:45	13	18	31	
23:00	12	22	34	164
23:15	15	26	41	
23:30	14	16	30	
23:45	7	16	23	
24:00	4	21	25	119
24 Hr Total	8916	8119	17035	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNN.TXT
CHANNEL 1- SOUTH BOUND
TAKEN BY - N. TALLEY

ROUTE - DIAMOND DRIVE
LOCATION - NORTH OF TRINITY SIGNAL PRIOR TO CANYON SIGNAL
CHANNEL 2- NORTH BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Tuesday September 29, 1992

Period Ends	South Bound	North Bound	Total	Hour Total
0:15	8	12	20	
0:30	6	9	15	
0:45	1	6	7	
1:00	4	8	12	54
1:15	3	6	9	
1:30	2	5	7	
1:45	2	6	8	
2:00	1	4	5	29
2:15	3	1	4	
2:30	3	3	6	
2:45	0	3	3	
3:00	0	4	4	17
3:15	2	4	6	
3:30	4	1	5	
3:45	2	2	4	
4:00	6	1	7	22
4:15	2	2	4	
4:30	2	0	2	
4:45	5	6	11	
5:00	3	2	5	22
5:15	8	2	10	
5:30	12	3	15	
5:45	18	3	21	
6:00	30	4	34	80
6:15	33	12	45	
6:30	62	16	78	
6:45	119	31	150	
7:00	180	39	219	492
7:15	249	65	314	
7:30	326	118	444	
7:45	358	116	474	
8:00	434	150	584	1816
8:15	356	128	484	
8:30	274	102	376	
8:45	162	70	232	
9:00	139	93	232	1324
9:15	136	79	215	
9:30	127	65	192	
9:45	98	92	190	
10:00	92	91	183	780
10:15	88	77	165	
10:30	91	97	188	
10:45	102	73	175	
11:00	112	101	213	741
11:15	112	95	207	
11:30	99	119	218	
11:45	155	179	334	
12:00	136	240	376	1135
2:15	144	205	349	
12:30	138	158	296	
12:45	202	94	296	
13:00	224	140	364	1305
13:15	201	140	341	
13:30	175	130	305	
13:45	144	109	253	
14:00	130	96	226	1125
14:15	111	80	191	
14:30	126	95	221	
14:45	114	163	277	
15:00	117	151	268	957
15:15	111	120	231	
15:30	150	104	254	
15:45	146	182	328	
16:00	208	188	396	1209
16:15	178	243	421	
16:30	114	221	335	
16:45	111	237	348	
17:00	109	258	367	1471
17:15	118	375	493	
17:30	150	392	542	
17:45	169	294	463	
18:00	145	225	370	1868
18:15	104	232	336	
18:30	134	157	291	
18:45	109	122	231	
19:00	132	158	290	1148
19:15	99	108	207	
19:30	109	89	198	
19:45	93	111	204	
20:00	60	78	138	747
20:15	65	78	143	
20:30	67	64	131	
20:45	55	64	119	
21:00	60	64	124	517
21:15	43	54	97	
21:30	33	53	86	
21:45	37	33	70	
22:00	24	42	66	319
22:15	26	31	57	
22:30	20	45	65	
22:45	17	29	46	
23:00	18	19	37	205
23:15	9	22	31	
23:30	20	14	34	
23:45	1	18	19	
24:00	3	16	19	103
24 Hr Total	9040	8446	17486	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNN.TXT
CHANNEL 1- SOUTH BOUND
TAKEN BY - M. TALLEY

ROUTE - DIAMOND DRIVE
LOCATION - NORTH OF TRINITY SIGNAL PRIOR TO CANYON SIGNAL
CHANNEL 2- NORTH BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Wednesday September 30, 1992

Period Ends	South Bound	North Bound	Total	Hour Total
0:15	7	8	15	
0:30	3	8	11	
0:45	1	8	9	
1:00	3	7	10	45
1:15	1	4	5	
1:30	1	2	3	
1:45	1	2	3	
2:00	2	1	3	14
2:15	4	2	6	
2:30	1	3	4	
2:45	0	0	0	
3:00	2	1	3	13
3:15	0	2	2	
3:30	1	0	1	
3:45	1	0	1	
4:00	6	1	7	11
4:15	3	2	5	
4:30	2	2	4	
4:45	4	5	9	
5:00	6	3	9	27
5:15	6	3	9	
5:30	14	2	16	
5:45	21	5	26	
6:00	39	13	52	103
6:15	43	10	53	
6:30	55	22	77	
6:45	106	24	130	
7:00	199	42	241	501
7:15	223	65	288	
7:30	309	113	422	
7:45	382	126	508	
8:00	408	136	544	1762
8:15	374	138	512	
8:30	270	115	385	
8:45	177	84	261	
9:00	168	98	266	1424
9:15	144	69	213	
9:30	129	69	198	
9:45	107	67	174	
10:00	93	88	181	766
10:15	101	74	175	
10:30	84	75	159	
10:45	87	85	172	
11:00	111	144	255	761
11:15	126	89	215	
11:30	104	110	214	
11:45	125	184	309	
12:00	164	228	392	1130
12:15	185	241	426	
12:30	162	170	332	
12:45	187	128	315	
13:00	258	106	364	1437
13:15	214	135	349	
13:30	158	113	271	
13:45	152	90	242	
14:00	136	131	267	1129
14:15	119	116	235	
14:30	119	118	237	
14:45	157	127	284	
15:00	184	122	306	1062
15:15	142	131	273	
15:30	126	118	244	
15:45	141	172	313	
16:00	146	173	319	1149
16:15	149	237	386	
16:30	146	197	343	
16:45	96	261	357	
17:00	119	268	387	1473
17:15	114	375	489	
17:30	141	365	506	
17:45	139	330	469	
18:00	126	215	341	1805
18:15	112	200	312	
18:30	100	143	243	
18:45	122	144	266	
19:00	146	182	328	1149
19:15	102	84	186	
19:30	90	102	192	
19:45	65	70	135	
20:00	55	75	130	643
20:15	61	67	128	
20:30	89	73	162	
20:45	85	62	147	
21:00	48	57	105	542
21:15	58	40	98	
21:30	37	74	111	
21:45	25	45	70	
22:00	32	56	88	367
22:15	14	34	48	
22:30	26	28	54	
22:45	17	29	46	
23:00	15	30	45	193
23:15	5	20	25	
23:30	13	12	25	
23:45	3	16	19	
24:00	6	10	16	85
24 Hr Total	9160	8431	17591	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNN.TXT
CHANNEL 1- SOUTH BOUND
TAKEN BY - N. TALLEY

ROUTE - DIAMOND DRIVE
LOCATION - NORTH OF TRINITY SIGNAL PRIOR TO CANYON SIGNAL
CHANNEL 2- NORTH BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Thursday October 1, 1992

Period Ends	South Bound	North Bound	Total	Hour Total
0:15	4	9	13	
0:30	3	9	12	
0:45	5	5	10	
1:00	0	1	1	36
1:15	2	3	5	
1:30	3	3	6	
1:45	2	1	3	
2:00	0	0	0	14
2:15	2	4	6	
2:30	2	3	5	
2:45	0	2	2	
3:00	1	3	4	17
3:15	0	1	1	
3:30	1	1	2	
3:45	3	1	4	
4:00	3	4	7	14
4:15	3	0	3	
4:30	3	3	6	
4:45	2	2	4	
5:00	6	3	9	22
5:15	6	2	8	
5:30	8	2	10	
5:45	17	0	17	
6:00	27	6	33	68
6:15	37	13	50	
6:30	65	18	83	
6:45	115	34	149	
7:00	196	35	231	513
7:15	244	72	316	
7:30	308	114	422	
7:45	354	116	470	
8:00	406	134	540	1748
8:15	348	143	491	
8:30	287	108	395	
8:45	186	87	273	
9:00	158	104	262	1421
9:15	125	69	194	
9:30	120	66	186	
9:45	105	83	188	
10:00	115	92	207	775
10:15	101	100	201	
10:30	92	88	180	
10:45	102	83	185	
11:00	97	114	211	777
11:15	111	109	220	
11:30	112	134	246	
11:45	155	177	332	
12:00	140	234	374	1172
2:15	148	236	384	
2:30	148	138	286	
12:45	214	114	328	
13:00	245	136	381	1379
13:15	197	123	320	
13:30	183	145	328	
13:45	134	109	243	
14:00	122	108	230	1121
14:15	113	103	216	
14:30	138	110	248	
14:45	130	120	250	
15:00	148	124	272	986
15:15	110	136	246	
15:30	145	105	250	
15:45	123	183	306	
16:00	235	159	394	1196
16:15	158	246	404	
16:30	152	236	388	
16:45	106	280	386	
17:00	130	259	389	1567
17:15	142	374	516	
17:30	143	374	517	
17:45	167	255	422	
18:00	153	235	388	1843
18:15	143	195	338	
18:30	146	166	312	
18:45	135	162	297	
19:00	115	145	260	1207
19:15	116	111	227	
19:30	109	87	196	
19:45	85	112	197	
20:00	63	78	141	761
20:15	55	75	130	
20:30	70	81	151	
20:45	43	44	87	
21:00	58	72	130	498
21:15	52	58	110	
21:30	33	59	92	
21:45	31	60	91	
22:00	42	49	91	384
22:15	30	55	85	
22:30	17	36	53	
22:45	16	29	45	
23:00	13	27	40	223
23:15	10	17	27	
23:30	12	14	26	
23:45	4	14	18	
24:00	3	16	19	90
24 Hr Total	9267	8565	17832	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNW.TXT
HANNEL 1- WEST & EAST BOUND
.AKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - WEST OF DIAMOND SIGNAL IN WESTERN AREA

24 Hour Start Date

Daily Printout of 2 Channel Data

* NOT TO NM STATE
TRAFFIC MONITORING STANDARDS

Saturday September 26, 1992

Period Ends	West East	Total	Hour Total
0:15	2	2	
0:30	7	7	
0:45	3	3	
1:00	2	2	14
1:15	2	2	
1:30	1	1	
1:45	3	3	
2:00	0	0	6
2:15	0	0	
2:30	0	0	
2:45	3	3	
3:00	1	1	4
3:15	0	0	
3:30	0	0	
3:45	1	1	
4:00	0	0	1
4:15	0	0	
4:30	0	0	
4:45	0	0	
5:00	1	1	1
5:15	1	1	
5:30	3	3	
5:45	3	3	
6:00	0	0	7
6:15	5	5	
6:30	2	2	
6:45	7	7	
7:00	3	3	17
7:15	8	8	
7:30	8	8	
7:45	9	9	
8:00	5	5	30
8:15	20	20	
8:30	27	27	
8:45	25	25	
9:00	26	26	98
9:15	32	32	
9:30	27	27	
9:45	35	35	
10:00	37	37	131
10:15	35	35	
10:30	21	21	
10:45	30	30	
11:00	18	18	104
11:15	37	37	
11:30	36	36	
11:45	31	31	
12:00	36	36	140
2:15	22	22	
12:30	38	38	
12:45	41	41	
13:00	33	33	134
13:15	31	31	
13:30	28	28	
13:45	32	32	
14:00	32	32	123
14:15	16	16	
14:30	23	23	
14:45	26	26	
15:00	20	20	85
15:15	28	28	
15:30	31	31	
15:45	35	35	
16:00	20	20	114
16:15	14	14	
16:30	12	12	
16:45	18	18	
17:00	23	23	67
17:15	14	14	
17:30	12	12	
17:45	23	23	
18:00	20	20	69
18:15	30	30	
18:30	13	13	
18:45	24	24	
19:00	12	12	79
19:15	16	16	
19:30	11	11	
19:45	19	19	
20:00	12	12	58
20:15	13	13	
20:30	4	4	
20:45	9	9	
21:00	7	7	33
21:15	1	1	
21:30	2	2	
21:45	8	8	
22:00	6	6	17
22:15	8	8	
22:30	8	8	
22:45	0	0	
23:00	5	5	21
23:15	0	0	
23:30	3	3	
23:45	4	4	
24:00	4	4	11
24 Hr Total	1364	1364	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNW.TXT
CHANNEL 1- WEST & EAST BOUND
TAKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - WEST OF DIAMOND SIGNAL IN WESTERN AREA

24 Hour Start Date

Daily Printout of 2 Channel Data

Sunday September 27, 1992

Period Ends	West East	Total	Hour Total
0:15	11	11	
0:30	16	16	
0:45	0	0	
1:00	2	2	29
1:15	0	0	
1:30	2	2	
1:45	0	0	
2:00	1	1	3
2:15	0	0	
2:30	0	0	
2:45	0	0	
3:00	0	0	0
3:15	0	0	
3:30	0	0	
3:45	1	1	
4:00	0	0	1
4:15	0	0	
4:30	1	1	
4:45	2	2	
5:00	0	0	3
5:15	0	0	
5:30	0	0	
5:45	0	0	
6:00	0	0	0
6:15	3	3	
6:30	2	2	
6:45	7	7	
7:00	6	6	18
7:15	10	10	
7:30	9	9	
7:45	11	11	
8:00	11	11	41
8:15	15	15	
8:30	12	12	
8:45	13	13	
9:00	15	15	55
9:15	18	18	
9:30	23	23	
9:45	8	8	
10:00	24	24	73
10:15	13	13	
10:30	25	25	
10:45	28	28	
11:00	29	29	95
11:15	20	20	
11:30	11	11	
11:45	17	17	
12:00	26	26	74
12:15	33	33	
12:30	34	34	
12:45	41	41	
13:00	28	28	136
13:15	29	29	
13:30	29	29	
13:45	25	25	
14:00	44	44	127
14:15	19	19	
14:30	32	32	
14:45	27	27	
15:00	18	18	96
15:15	15	15	
15:30	23	23	
15:45	30	30	
16:00	29	29	97
16:15	44	44	
16:30	36	36	
16:45	29	29	
17:00	41	41	150
17:15	22	22	
17:30	27	27	
17:45	41	41	
18:00	50	50	140
18:15	44	44	
18:30	31	31	
18:45	34	34	
19:00	44	44	153
19:15	36	36	
19:30	24	24	
19:45	14	14	
20:00	24	24	98
20:15	30	30	
20:30	7	7	
20:45	16	16	
21:00	18	18	71
21:15	19	19	
21:30	20	20	
21:45	7	7	
22:00	8	8	54
22:15	8	8	
22:30	5	5	
22:45	4	4	
23:00	2	2	19
23:15	3	3	
23:30	5	5	
23:45	0	0	
24:00	3	3	11
24 Hr Total	1544	1544	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNW.TXT
HANNEL 1- WEST & EAST BOUND
AKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - WEST OF DIAMOND SIGNAL IN WESTERN AREA

24 Hour Start Date

Daily Printout of 2 Channel Data

Monday September 28, 1992

Period Ends	West East	Total	Hour Total
0:15	3	3	
0:30	1	1	
0:45	0	0	
1:00	0	0	4
1:15	1	1	
1:30	2	2	
1:45	0	0	
2:00	4	4	7
2:15	0	0	
2:30	0	0	
2:45	0	0	
3:00	0	0	0
3:15	0	0	
3:30	0	0	
3:45	0	0	
4:00	0	0	0
4:15	0	0	
4:30	0	0	
4:45	2	2	
5:00	1	1	3
5:15	2	2	
5:30	1	1	
5:45	5	5	
6:00	2	2	10
6:15	6	6	
6:30	1	1	
6:45	4	4	
7:00	17	17	28
7:15	25	25	
7:30	39	39	
7:45	37	37	
8:00	66	66	167
8:15	43	43	
8:30	41	41	
8:45	35	35	
9:00	32	32	151
9:15	20	20	
9:30	36	36	
9:45	29	29	
10:00	29	29	114
10:15	39	39	
10:30	35	35	
10:45	43	43	
11:00	33	33	150
11:15	53	53	
11:30	32	32	
11:45	47	47	
12:00	65	65	197
2:15	58	58	
12:30	54	54	
12:45	58	58	
13:00	43	43	213
13:15	60	60	
13:30	34	34	
13:45	40	40	
14:00	31	31	165
14:15	45	45	
14:30	37	37	
14:45	47	47	
15:00	37	37	166
15:15	49	49	
15:30	37	37	
15:45	51	51	
16:00	64	64	201
16:15	54	54	
16:30	63	63	
16:45	63	63	
17:00	90	90	270
17:15	83	83	
17:30	67	67	
17:45	76	76	
18:00	60	60	286
18:15	61	61	
18:30	54	54	
18:45	57	57	
19:00	45	45	217
19:15	37	37	
19:30	46	46	
19:45	24	24	
20:00	14	14	121
20:15	28	28	
20:30	33	33	
20:45	28	28	
21:00	16	16	105
21:15	17	17	
21:30	22	22	
21:45	13	13	
22:00	7	7	59
22:15	10	10	
22:30	8	8	
22:45	9	9	
23:00	6	6	33
23:15	2	2	
23:30	5	5	
23:45	5	5	
24:00	2	2	14
24 Hr Total	2681	2681	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNW.TXT
CHANNEL 1- WEST & EAST BOUND
TAKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - WEST OF DIAMOND SIGNAL IN WESTERN AREA

24 Hour Start Date

Daily Printout of 2 Channel Data

Tuesday September 29, 1992

Period Ends	West East	Total	Hour Total
0:15	0	0	
0:30	0	0	
0:45	0	0	
1:00	0	0	0
1:15	2	2	
1:30	0	0	
1:45	1	1	
2:00	0	0	3
2:15	0	0	
2:30	0	0	
2:45	0	0	
3:00	0	0	0
3:15	0	0	
3:30	0	0	
3:45	0	0	
4:00	0	0	0
4:15	0	0	
4:30	0	0	
4:45	0	0	
5:00	4	4	4
5:15	3	3	
5:30	1	1	
5:45	1	1	
6:00	6	6	11
6:15	6	6	
6:30	6	6	
6:45	9	9	
7:00	20	20	41
7:15	24	24	
7:30	41	41	
7:45	36	36	
8:00	40	40	141
8:15	52	52	
8:30	30	30	
8:45	30	30	
9:00	26	26	138
9:15	27	27	
9:30	20	20	
9:45	34	34	
10:00	41	41	122
10:15	31	31	
10:30	26	26	
10:45	33	33	
11:00	57	57	147
11:15	34	34	
11:30	34	34	
11:45	42	42	
12:00	58	58	168
12:15	57	57	
12:30	32	32	
12:45	36	36	
13:00	44	44	169
13:15	36	36	
13:30	22	22	
13:45	21	21	
14:00	23	23	102
14:15	32	32	
14:30	26	26	
14:45	20	20	
15:00	29	29	107
15:15	27	27	
15:30	28	28	
15:45	41	41	
16:00	32	32	128
16:15	40	40	
16:30	28	28	
16:45	43	43	
17:00	35	35	146
17:15	44	44	
17:30	56	56	
17:45	34	34	
18:00	37	37	171
18:15	39	39	
18:30	30	30	
18:45	31	31	
19:00	46	46	146
19:15	24	24	
19:30	26	26	
19:45	31	31	
20:00	24	24	105
20:15	20	20	
20:30	20	20	
20:45	13	13	
21:00	17	17	70
21:15	9	9	
21:30	14	14	
21:45	3	3	
22:00	14	14	40
22:15	8	8	
22:30	4	4	
22:45	4	4	
23:00	2	2	18
23:15	1	1	
23:30	4	4	
23:45	2	2	
24:00	1	1	8
24 Hr Total	1985	1985	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNW.TXT
CHANNEL 1- WEST & EAST BOUND
TAKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - WEST OF DIAMOND SIGNAL IN WESTERN AREA

24 Hour Start Date

Daily Printout of 2 Channel Data

Wednesday September 30, 1992

Period Ends	West East	Total	Hour Total
0:15	1	1	
0:30	1	1	
0:45	0	0	
1:00	0	0	2
1:15	0	0	
1:30	0	0	
1:45	0	0	
2:00	0	0	0
2:15	1	1	
2:30	0	0	
2:45	0	0	
3:00	0	0	1
3:15	0	0	
3:30	0	0	
3:45	0	0	
4:00	0	0	0
4:15	0	0	
4:30	0	0	
4:45	1	1	
5:00	0	0	1
5:15	1	1	
5:30	0	0	
5:45	1	1	
6:00	4	4	6
6:15	9	9	
6:30	4	4	
6:45	5	5	
7:00	10	10	28
7:15	15	15	
7:30	17	17	
7:45	32	32	
8:00	49	49	113
8:15	29	29	
8:30	32	32	
8:45	22	22	
9:00	22	22	105
9:15	21	21	
9:30	16	16	
9:45	15	15	
10:00	30	30	82
10:15	31	31	
10:30	26	26	
10:45	21	21	
11:00	29	29	107
11:15	32	32	
11:30	33	33	
11:45	35	35	
12:00	38	38	138
12:15	34	34	
12:30	30	30	
12:45	31	31	
13:00	35	35	130
13:15	41	41	
13:30	21	21	
13:45	24	24	
14:00	30	30	116
14:15	29	29	
14:30	33	33	
14:45	40	40	
15:00	45	45	147
15:15	20	20	
15:30	32	32	
15:45	32	32	
16:00	28	28	112
16:15	29	29	
16:30	32	32	
16:45	36	36	
17:00	42	42	139
17:15	39	39	
17:30	37	37	
17:45	45	45	
18:00	33	33	154
18:15	36	36	
18:30	33	33	
18:45	37	37	
19:00	32	32	138
19:15	25	25	
19:30	21	21	
19:45	12	12	
20:00	12	12	70
20:15	18	18	
20:30	18	18	
20:45	12	12	
21:00	10	10	58
21:15	13	13	
21:30	9	9	
21:45	7	7	
22:00	7	7	36
22:15	11	11	
22:30	6	6	
22:45	5	5	
23:00	3	3	25
23:15	1	1	
23:30	0	0	
23:45	2	2	
24:00	5	5	8
24 Hr Total	1716	1716	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNW.TXT
CHANNEL 1- WEST & EAST BOUND
TAKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - WEST OF DIAMOND SIGNAL IN WESTERN AREA

24 Hour Start Date

Daily Printout of 2 Channel Data

Thursday October 1, 1992

Period Ends	West East	Total	Hour Total
0:15	0	0	
0:30	2	2	
0:45	0	0	
1:00	0	0	2
1:15	1	1	
1:30	1	1	
1:45	1	1	
2:00	0	0	3
2:15	0	0	
2:30	0	0	
2:45	0	0	
3:00	0	0	0
3:15	0	0	
3:30	0	0	
3:45	0	0	
4:00	1	1	1
4:15	0	0	
4:30	0	0	
4:45	3	3	
5:00	0	0	3
5:15	2	2	
5:30	0	0	
5:45	2	2	
6:00	2	2	6
6:15	6	6	
6:30	5	5	
6:45	3	3	
7:00	9	9	23
7:15	19	19	
7:30	19	19	
7:45	26	26	
8:00	44	44	108
8:15	31	31	
8:30	24	24	
8:45	28	28	
9:00	31	31	114
9:15	29	29	
9:30	24	24	
9:45	26	26	
10:00	19	19	98
10:15	22	22	
10:30	13	13	
10:45	25	25	
11:00	18	18	78
11:15	24	24	
11:30	24	24	
11:45	31	31	
12:00	44	44	123
12:15	35	35	
12:30	25	25	
12:45	35	35	
13:00	44	44	139
13:15	26	26	
13:30	39	39	
13:45	28	28	
14:00	21	21	114
14:15	21	21	
14:30	24	24	
14:45	26	26	
15:00	36	36	107
15:15	35	35	
15:30	28	28	
15:45	32	32	
16:00	34	34	129
16:15	32	32	
16:30	39	39	
16:45	32	32	
17:00	42	42	145
17:15	46	46	
17:30	46	46	
17:45	41	41	
18:00	43	43	176
18:15	32	32	
18:30	33	33	
18:45	38	38	
19:00	31	31	134
19:15	32	32	
19:30	35	35	
19:45	17	17	
20:00	17	17	101
20:15	16	16	
20:30	19	19	
20:45	11	11	
21:00	11	11	57
21:15	15	15	
21:30	24	24	
21:45	11	11	
22:00	9	9	59
22:15	15	15	
22:30	7	7	
22:45	1	1	
23:00	1	1	24
23:15	4	4	
23:30	1	1	
23:45	2	2	
24:00	2	2	9
24 Hr Total	1753	1753	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNE.TXT
CHANNEL 1- EAST BOUND
TAKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - EAST OF DIAMOND SIGNAL NEAR HOSPITAL ENT.
CHANNEL 2- WEST BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

* NOT TO NM STATE TRAFFIC MONITORING STANDARDS

Saturday Sep 26, 1992

Period Ends	East Bound	West Bound	Total	Hour Total
0:15	19	24	43	
0:30	12	9	21	
0:45	8	9	17	
1:00	6	12	18	99
1:15	7	5	12	
1:30	6	3	9	
1:45	4	10	14	
2:00	10	4	14	49
2:15	7	1	8	
2:30	2	3	5	
2:45	2	1	3	
3:00	2	3	5	21
3:15	1	1	2	
3:30	4	0	4	
3:45	1	5	6	
4:00	5	7	12	24
4:15	1	2	3	
4:30	3	1	4	
4:45	2	2	4	
5:00	4	13	17	28
5:15	4	3	7	
5:30	6	7	13	
5:45	10	9	19	
6:00	11	6	17	56
6:15	9	7	16	
6:30	15	12	27	
6:45	17	25	42	
7:00	33	37	70	155
7:15	36	21	57	
7:30	44	34	78	
7:45	41	27	68	
8:00	68	29	97	300
8:15	73	39	112	
8:30	61	37	98	
8:45	92	56	148	
9:00	92	52	144	502
9:15	124	53	177	
9:30	92	74	166	
9:45	98	65	163	
10:00	116	79	195	701
10:15	127	80	207	
10:30	147	80	227	
10:45	121	103	224	
11:00	145	89	234	892
11:15	129	85	214	
11:30	141	99	240	
11:45	133	120	253	
12:00	146	113	259	966
12:15	157	123	280	
12:30	135	143	278	
12:45	129	122	251	
13:00	133	114	247	1056
13:15	105	115	220	
13:30	104	109	213	
13:45	125	128	253	
14:00	105	110	215	901
14:15	117	104	221	
14:30	108	111	219	
14:45	122	99	221	
15:00	103	101	204	865
15:15	81	112	193	
15:30	84	111	195	
15:45	114	67	181	
16:00	126	88	214	783
16:15	97	75	172	
16:30	99	96	195	
16:45	85	120	205	
17:00	97	104	201	773
17:15	84	87	171	
17:30	81	84	165	
17:45	85	87	172	
18:00	62	73	135	643
18:15	91	76	167	
18:30	88	77	165	
18:45	80	58	138	
19:00	78	50	128	598
19:15	76	64	140	
19:30	66	73	139	
19:45	89	53	142	
20:00	52	67	119	540
20:15	54	66	120	
20:30	37	49	86	
20:45	36	63	99	
21:00	24	43	67	372
21:15	50	42	92	
21:30	24	48	72	
21:45	39	45	84	
22:00	17	48	65	313
22:15	19	46	65	
22:30	19	31	50	
22:45	25	42	67	
23:00	21	51	72	254
23:15	22	37	59	
23:30	11	25	36	
23:45	19	17	36	
24:00	21	20	41	172
24 Hr Total	5833	5230	11063	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNE.TXT
CHANNEL 1- EAST BOUND
TAKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - EAST OF DIAMOND SIGNAL NEAR HOSPITAL ENT.
CHANNEL 2- WEST BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Sunday September 27, 1992

Period Ends	East Bound	West Bound	Total	Hour Total
0:15	32	18	50	
0:30	13	20	33	
0:45	15	11	26	
1:00	10	7	17	126
1:15	10	7	17	
1:30	10	2	12	
1:45	4	7	11	
2:00	1	9	10	50
2:15	3	4	7	
2:30	4	2	6	
2:45	2	4	6	
3:00	5	6	11	30
3:15	3	1	4	
3:30	4	2	6	
3:45	2	4	6	
4:00	2	5	7	23
4:15	3	4	7	
4:30	3	2	5	
4:45	2	4	6	
5:00	4	9	13	31
5:15	1	4	5	
5:30	6	4	10	
5:45	5	6	11	
6:00	4	8	12	38
6:15	11	2	13	
6:30	12	7	19	
6:45	19	8	27	
7:00	14	12	26	85
7:15	19	10	29	
7:30	28	28	56	
7:45	30	13	43	
8:00	29	19	48	176
8:15	39	27	66	
8:30	55	34	89	
8:45	45	38	83	
9:00	91	47	138	376
9:15	71	44	115	
9:30	71	38	109	
9:45	47	44	91	
10:00	88	57	145	460
10:15	70	54	124	
10:30	53	50	103	
10:45	66	56	122	
11:00	71	45	116	465
11:15	73	59	132	
11:30	90	57	147	
11:45	91	74	165	
12:00	103	67	170	614
12:15	87	64	151	
12:30	115	93	208	
12:45	102	94	196	
13:00	91	100	191	746
13:15	83	84	167	
13:30	87	84	171	
13:45	98	78	176	
14:00	109	72	181	695
14:15	87	106	193	
14:30	92	89	181	
14:45	82	77	159	
15:00	91	82	173	706
15:15	65	94	159	
15:30	87	59	146	
15:45	60	79	139	
16:00	81	89	170	614
16:15	77	80	157	
16:30	82	71	153	
16:45	63	69	132	
17:00	78	72	150	592
17:15	84	77	161	
17:30	60	71	131	
17:45	78	66	144	
18:00	81	82	163	599
18:15	88	67	155	
18:30	75	75	150	
18:45	56	64	120	
19:00	57	81	138	563
19:15	68	56	124	
19:30	44	63	107	
19:45	58	39	97	
20:00	41	67	108	436
20:15	29	68	97	
20:30	27	28	55	
20:45	26	63	89	
21:00	27	13	40	281
21:15	26	40	66	
21:30	9	21	30	
21:45	20	17	37	
22:00	10	22	32	165
22:15	19	28	47	
22:30	12	13	25	
22:45	10	27	37	
23:00	16	12	28	137
23:15	4	15	19	
23:30	7	15	22	
23:45	5	5	10	
24:00	11	8	19	70
24 Hr Total	4199	3879	8078	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNE.TXT
CHANNEL 1- EAST BOUND
TAKEN BY - M. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - EAST OF DIAMOND SIGNAL NEAR HOSPITAL ENT.
CHANNEL 2- WEST BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Monday September 28, 1992

Period Ends	East Bound	West Bound	Total	Hour Total
0:15	5	4	9	
0:30	7	7	14	
0:45	4	6	10	
1:00	3	2	5	38
1:15	7	1	8	
1:30	1	1	2	
1:45	2	4	6	
2:00	3	3	6	22
2:15	2	5	7	
2:30	1	0	1	
2:45	3	3	6	
3:00	0	0	0	14
3:15	3	1	4	
3:30	3	3	6	
3:45	2	1	3	
4:00	2	3	5	18
4:15	7	1	8	
4:30	2	3	5	
4:45	2	7	9	
5:00	3	12	15	37
5:15	3	2	5	
5:30	9	2	11	
5:45	13	9	22	
6:00	16	12	28	66
6:15	18	19	37	
6:30	22	19	41	
6:45	34	58	92	
7:00	69	127	196	366
7:15	90	130	220	
7:30	114	162	276	
7:45	127	226	353	
8:00	179	244	423	1272
8:15	168	209	377	
8:30	148	141	289	
8:45	132	147	279	
9:00	162	127	289	1234
9:15	153	149	302	
9:30	141	120	261	
9:45	136	114	250	
10:00	145	115	260	1073
10:15	158	145	303	
10:30	133	108	241	
10:45	134	118	252	
11:00	159	102	261	1057
11:15	176	150	326	
11:30	179	134	313	
11:45	329	157	486	
12:00	316	189	505	1630
12:15	388	220	608	
12:30	238	265	503	
12:45	190	281	471	
13:00	203	375	578	2160
13:15	204	298	502	
13:30	160	256	416	
13:45	168	176	344	
14:00	154	179	333	1595
14:15	160	160	320	
14:30	149	153	302	
14:45	160	139	299	
15:00	147	200	347	1268
15:15	184	158	342	
15:30	195	118	313	
15:45	228	127	355	
16:00	269	162	431	1441
16:15	391	155	546	
16:30	299	158	457	
16:45	308	187	495	
17:00	272	163	435	1933
17:15	336	244	580	
17:30	327	234	561	
17:45	275	176	451	
18:00	217	172	389	1981
18:15	155	170	325	
18:30	113	137	250	
18:45	123	95	218	
19:00	119	76	195	988
19:15	110	75	185	
19:30	90	93	183	
19:45	69	69	138	
20:00	45	66	111	617
20:15	63	63	126	
20:30	54	59	113	
20:45	49	45	94	
21:00	44	44	88	421
21:15	47	32	79	
21:30	34	47	81	
21:45	23	27	50	
22:00	25	38	63	273
22:15	18	25	43	
22:30	15	39	54	
22:45	14	22	36	
23:00	12	15	27	160
23:15	19	26	45	
23:30	18	16	34	
23:45	26	7	33	
24:00	18	12	30	142
24 Hr Total	10450	9356	19806	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNE.TXT
CHANNEL 1- EAST BOUND
TAKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - EAST OF DIAMOND SIGNAL NEAR HOSPITAL ENT.
CHANNEL 2- WEST BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Tuesday September 29, 1992

Period Ends	East Bound	West Bound	Total	Hour Total
0:15	16	9	25	
0:30	6	7	13	
0:45	4	2	6	
1:00	3	6	9	53
1:15	3	5	8	
1:30	2	2	4	
1:45	3	5	8	
2:00	1	6	7	27
2:15	7	1	8	
2:30	0	2	2	
2:45	1	2	3	
3:00	2	1	3	16
3:15	2	2	4	
3:30	3	0	3	
3:45	2	1	3	
4:00	6	4	10	20
4:15	2	7	9	
4:30	4	2	6	
4:45	3	6	9	
5:00	3	12	15	39
5:15	7	3	10	
5:30	4	7	11	
5:45	9	7	16	
6:00	17	10	27	64
6:15	18	23	41	
6:30	21	18	39	
6:45	44	72	116	
7:00	68	139	207	403
7:15	91	145	236	
7:30	133	190	323	
7:45	137	205	342	
8:00	158	268	426	1327
8:15	157	255	412	
8:30	165	162	327	
8:45	133	156	289	
9:00	175	133	308	1336
9:15	123	123	246	
9:30	158	124	282	
9:45	131	133	264	
10:00	152	129	281	1073
10:15	131	123	254	
10:30	145	124	269	
10:45	150	134	284	
11:00	156	151	307	1114
11:15	196	134	330	
11:30	199	149	348	
11:45	316	171	487	
2:00	338	194	532	1697
12:15	368	196	564	
12:30	208	250	458	
12:45	192	301	493	
13:00	207	346	553	2068
13:15	181	268	449	
13:30	150	262	412	
13:45	153	215	368	
14:00	162	159	321	1550
14:15	132	164	296	
14:30	139	141	280	
14:45	189	169	358	
15:00	196	189	385	1319
15:15	164	150	314	
15:30	167	158	325	
15:45	234	135	369	
16:00	288	161	449	1457
16:15	390	157	547	
16:30	305	177	482	
16:45	282	157	439	
17:00	265	186	451	1919
17:15	306	207	513	
17:30	312	245	557	
17:45	282	210	492	
18:00	198	157	355	1917
18:15	175	157	332	
18:30	189	124	313	
18:45	137	102	239	
19:00	154	93	247	1131
19:15	109	101	210	
19:30	112	71	183	
19:45	104	95	199	
20:00	66	70	136	728
20:15	66	76	142	
20:30	58	58	116	
20:45	53	53	106	
21:00	48	62	110	474
21:15	42	65	107	
21:30	27	56	83	
21:45	34	30	64	
22:00	17	37	54	308
22:15	26	27	53	
22:30	20	42	62	
22:45	14	16	30	
23:00	12	22	34	179
23:15	12	7	19	
23:30	19	18	37	
23:45	18	11	29	
24:00	14	15	29	114
24 Hr Total	10601	9732	20333	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNE.TXT
CHANNEL 1- EAST BOUND
TAKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - EAST OF DIAMOND SIGNAL NEAR HOSPITAL ENT.
CHANNEL 2- WEST BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Wednesday September 30, 1992

Period Ends	East Bound	West Bound	Total	Hour Total
0:15	7	3	10	
0:30	10	10	20	
0:45	2	9	11	
1:00	2	7	9	50
1:15	3	6	9	
1:30	0	2	2	
1:45	3	2	5	
2:00	2	0	2	18
2:15	4	3	7	
2:30	3	1	4	
2:45	0	0	0	
3:00	0	2	2	13
3:15	3	1	4	
3:30	3	0	3	
3:45	0	0	0	
4:00	4	2	6	13
4:15	3	3	6	
4:30	4	3	7	
4:45	2	5	7	
5:00	3	7	10	30
5:15	4	9	13	
5:30	7	7	14	
5:45	8	9	17	
6:00	17	15	32	76
6:15	20	21	41	
6:30	22	27	49	
6:45	49	61	110	
7:00	67	134	201	401
7:15	77	142	219	
7:30	101	186	287	
7:45	134	221	355	
8:00	182	263	445	1306
8:15	161	209	370	
8:30	173	165	338	
8:45	139	132	271	
9:00	152	141	293	1272
9:15	135	123	258	
9:30	140	125	265	
9:45	149	110	259	
10:00	131	134	265	1047
10:15	151	136	287	
10:30	138	113	251	
10:45	124	143	267	
11:00	147	122	269	1074
11:15	171	152	323	
11:30	221	130	351	
11:45	314	169	483	
12:00	356	216	572	1729
12:15	412	197	609	
12:30	225	257	482	
12:45	188	283	471	
13:00	206	357	563	2125
13:15	221	345	566	
13:30	188	253	441	
13:45	159	207	366	
14:00	170	158	328	1701
14:15	162	162	324	
14:30	171	175	346	
14:45	163	195	358	
15:00	178	169	347	1375
15:15	186	146	332	
15:30	183	134	317	
15:45	244	148	392	
16:00	255	165	420	1461
16:15	370	164	534	
16:30	323	145	468	
16:45	323	178	501	
17:00	265	176	441	1944
17:15	315	245	560	
17:30	296	279	575	
17:45	250	211	461	
18:00	179	139	318	1914
18:15	183	149	332	
18:30	132	102	234	
18:45	148	112	260	
19:00	158	127	285	1111
19:15	125	83	208	
19:30	70	103	173	
19:45	69	71	140	
20:00	69	67	136	657
20:15	66	76	142	
20:30	44	62	106	
20:45	68	63	131	
21:00	44	60	104	483
21:15	41	47	88	
21:30	27	67	94	
21:45	32	36	68	
22:00	16	53	69	319
22:15	16	41	57	
22:30	25	17	42	
22:45	19	32	51	
23:00	13	17	30	180
23:15	8	23	31	
23:30	14	12	26	
23:45	12	8	20	
24:00	15	7	22	99
24 Hr Total	10594	9804	20398	

09-02-1992

LOS ALAMOS COUNTY - TRAFFIC ENGINEERING
TRAFFIC COUNTS - DIAMOND & TRINITY

COUNTY - LOS ALAMOS
SITE ID - DIAMTRNE.TXT
CHANNEL 1- EAST BOUND
TAKEN BY - N. TALLEY

ROUTE - TRINITY DRIVE
LOCATION - EAST OF DIAMOND SIGNAL NEAR HOSPITAL ENT.
CHANNEL 2- WEST BOUND

24 Hour Start Date

Daily Printout of 2 Channel Data

Thursday October 1, 1992

Period Ends	East Bound	West Bound	Total	Hour Total
0:15	7	12	19	
0:30	6	4	10	
0:45	2	2	4	
1:00	5	4	9	42
1:15	3	1	4	
1:30	2	1	3	
1:45	2	0	2	
2:00	0	1	1	10
2:15	1	2	3	
2:30	4	1	5	
2:45	1	2	3	
3:00	2	3	5	16
3:15	1	0	1	
3:30	3	0	3	
3:45	1	0	1	
4:00	4	7	11	16
4:15	3	4	7	
4:30	3	1	4	
4:45	1	7	8	
5:00	2	3	5	24
5:15	7	5	12	
5:30	2	8	10	
5:45	11	4	15	
6:00	15	8	23	60
6:15	16	29	45	
6:30	19	11	30	
6:45	46	54	100	
7:00	79	153	232	407
7:15	96	129	225	
7:30	120	196	316	
7:45	134	196	330	
8:00	165	292	457	1328
8:15	182	233	415	
8:30	173	155	328	
8:45	137	160	297	
9:00	155	151	306	1346
9:15	139	137	276	
9:30	119	109	228	
9:45	114	126	240	
10:00	142	137	279	1023
10:15	147	131	278	
10:30	145	122	267	
10:45	145	139	284	
11:00	147	141	288	1117
11:15	237	147	384	
11:30	195	161	356	
11:45	391	159	550	
12:00	396	211	607	1897
12:15	406	223	629	
12:30	248	274	522	
12:45	215	333	548	
13:00	210	403	613	2312
13:15	171	352	523	
13:30	180	297	477	
13:45	184	197	381	
14:00	165	167	332	1713
14:15	163	166	329	
14:30	200	153	353	
14:45	164	169	333	
15:00	191	171	362	1377
15:15	186	184	370	
15:30	199	143	342	
15:45	283	146	429	
16:00	278	153	431	1572
16:15	408	159	567	
16:30	320	202	522	
16:45	324	187	511	
17:00	280	163	443	2043
17:15	347	237	584	
17:30	280	269	549	
17:45	273	186	459	
18:00	217	190	407	1999
18:15	225	193	418	
18:30	155	124	279	
18:45	138	136	274	
19:00	126	118	244	1215
19:15	113	104	217	
19:30	127	88	215	
19:45	74	83	157	
20:00	71	93	164	753
20:15	65	91	156	
20:30	49	68	117	
20:45	56	74	130	
21:00	47	59	106	509
21:15	42	60	102	
21:30	35	65	100	
21:45	31	60	91	
22:00	32	42	74	367
22:15	28	53	81	
22:30	19	35	54	
22:45	16	36	52	
23:00	14	11	25	212
23:15	13	26	39	
23:30	13	10	23	
23:45	25	10	35	
24:00	12	13	25	122
24 Hr Total	11145	10335	21480	

The most current iteration of Standard Operating Procedures (SOP) for units at Technical Area (TA) 16 are included as Appendices C through J for information purposes only and are included to provide information pertinent to operations at the TA-16 units addressed in this permit application. These SOPs are and will be amended periodically. The following list reflects recent organizational changes pertinent to these SOPs:

Old Group Name(s)	New Group Name(s)
HSE-1	ESH-1
HSE-2	ESH-2
HSE-3	ESH-3
HSE-7	ESH-7
J-6	DX-14
J-8	DX-12
M-1	DX-16
MAT-4	BUS-7
MEC-5	ESA-WMM
WX-1/ESA-1	ESA-WE
WX-3/ESA-2	ESA-WMM
WX-5/ESA-5	ESA-WE
WX-11/ESA-11	ESA-EA/ESA-MT
WX-12/ESA-12	ESA-DE/ESA-WMM

APPENDIX C

Emergency Response Standard Operating Procedures

September 19, 1991

S-SITE EMERGENCY RESPONSE PLAN

REVIEWED AND APPROVED:

H. Flaugh, WX-1	9-23-91 DATE
L. A. Stretz, WX-3	9/19/91 DATE
E. M. Hanson, WX-5	10/8/91 DATE
J. N. Peterson, J-6	10/5/91 DATE
J. A. Perea, J-8	10/3/91 DATE
J. J. Ruminer, WX-11	9/23/91 DATE
C. A. Spirio, WX-12	9/23/91 DATE
J. C. Dallman, M-1	9-25-91 DATE
W. A. Bradley, WX-DO	10/10/91 DATE

S-SITE EMERGENCY RESPONSE PLAN

I. INTRODUCTION

The purpose of this document is to provide a workable framework for the protection of life, property, and the environment during and after emergency situations at S-Site. S-Site is a complex collection of operating buildings involving several different Groups and Divisions. This document supplements individual building emergency plans to provide for coordination between the various tenants of the site. Throughout this plan, guiding principles are:

A. Keep it simple, such that in the heat of an emergency its content is readily recalled.

B. Keep it brief, such that it is willingly read and easily reviewed.

C. Keep it flexible, because in no way can such a plan offer a detailed response for every contingency

Throughout this plan, reference to S-Site includes K-Site (TA-11) and the magazine areas TA-28 and TA-37, and NDE operations at TA-8.

II. EMERGENCY CRITERIA

Because many of our activities involve the handling and processing of high explosives (HE), a prime consideration in making plans is whether HE is present at the site of an emergency. In the Administration Area, the usual responses can be made to the usual industrial hazard, but in the Explosives Area, we must deal with the particular hazards of HE.

The following emergencies can occur at S-Site:

A. <u>Accidental Detonation</u> - Fire and severe injuries may occur, for which the emergency response is described below. If neither occurs, personnel leave the immediate area, summon emergency response via alarm pull boxes and call 911/9-911, which will also notify the Emergency Management Office (EMO). As soon as practical, the group office responsible for the facility should be notified. Structural damage to buildings and equipment is likely to occur and must be evaluated before reentry and recovery begin.

B. Fire in Explosives - Detonation is assumed to be imminent. Personnel immediately evacuate to a designated assembly location, summon the fire department, and notify the responsible group office. When the presence of explosives is indicated, emergency response crews are not to approach closer than 1,000 feet until they have consulted with operating personnel.

C. Fire away from Explosives - The area is evacuated, the fire department is summoned, small fires are attacked with an appropriate fire extinguisher, and the appropriate group office is notified. Structural damage to the building or equipment must be evaluated before reentry and recovery begin.

D. Severe Illness or Injury - If the injury or illness appears to be severe, emergency response is requested by calling 9-911 or 911, CPR or first aid is administered, and the responsible group office is notified. In case of electrical shock, the circuit is de-energized or the victim removed from contact with the electric source before CPR and first aid are started. All minor injuries and occupational illnesses must be treated immediately and reported to the person's supervisor.

E. Spill of Hazardous Material - The users of toxic or flammable materials are trained in specific responses to a spill and take immediate action. Reagents that nullify the hazardous effects of a chemical spill are kept ready for use near the work areas where the chemicals are used. Specific hazards and responses should be identified for each building. The supervisor responsible for the area where the spill occurs notify the group spill coordinator, the group office and the S-Site Spill Coordinator (7-4307) of any major incidents.

During times outside the normal working hours, spills are most likely to be discovered by a Protective Force Inspector who reports the incident through the Central Alarm Station to an S-Site respondent.

F. Release of Radioactive Material - Explicit SOPs govern operation of Tritium Handling Facilities. Response to any accidental release is made in accordance with the applicable SOP.

G. Exposure to Radiation - Explicit SOPs that govern the handling of radioactive materials call for the presence of a Health Physics Surveyor, who measures radiation levels. If the surveyor finds that radiation is approaching hazardous levels, he advises the supervisor, who takes appropriate action. If hazardous levels are reached, the supervisor directs the evacuation and closing of the work area. The incident is then reported to the appropriate group office by the supervisor and measures are taken, in cooperation with HS Division personnel, to reduce the hazard and restore the work area to a safe condition.

H. Civil Disturbance/Terrorist Threat - If threats of forced entry to sites are made or a militant gathering of people occurs near a site during normal work hours, the discoverer notifies his/her group office immediately. The group office will notify WX-DO and, in collaboration with them, issue instructions to affected S-Site personnel. Until instructed otherwise by their group office or Protective Force, S-Site personnel secure entrances and remain in their assigned work places away from the exterior windows.

Civil disturbances during times outside normal working hours are handled by the Protective Force.

I. Bomb Threat - Response is to keep caller on the telephone and for another person to call 911/9-911 as prescribed in the first page of the Laboratory telephone directory.

J. Natural Disasters An earthquake of intensity sufficient to cause severe structural damage is unlikely, in view of the construction of most of the site buildings and the geological history to the area. If one occurs, its effects in terms of injuries, fire or equipment malfunction would dictate the Site response. If the effects are widespread, the implementation of Civil Defense plans will be indicated.

Tornadoes are as unlikely as earthquakes. Our response would be the same.

Forest fires are a present danger. The Site response would be dictated by the location and intensity of the fire. General responses may be:

1. assignment of fire watchers on roof tops
2. removal of combustibles near sensitive buildings
3. assistance of the Fire Department in controlling the fire

K. Equipment Malfunctions - In the preparation of the SOPs that govern all hazardous operations, the possibility of erratic operation or failure of operating or supporting equipment is considered, and countermeasures are defined. Explosion, fire, or injury as a result of equipment malfunction are responded to as described previously.

L. Motor Vehicle Accident - Injury and fire are the possible emergencies and are responded to as described previously. In the case of a vehicle transporting high explosives, emergency response crews must consult with S-Site operating personnel, either at the scene or through the WX-3 Group Office, before approaching the vehicle.

M. Utility Failure - Property damage as a result of escaping water or steam or loss of critical heating or cooling is the nature of this emergency. During duty hours, the problem is resolved through the Group WX-12 Plant and Equipment Services Section. Outside of duty hours, the utility failure is most likely to be discovered by a Protective Force Inspector, who notifies the Central Alarm Station. The Central Alarm Station uses the current first-level S-Site call-out list, and the person called responds in a manner appropriate to the emergency.

III. INITIAL EMERGENCY RESPONSE

Initial response to any emergency is the responsibility of the nearest nonincapacitated person. To aid this initial response, emergency instructions in check list format are included on the evacuation plan posters which are posted in each operating building. Specialized instructions for each credible emergency, are provided at the operating location for such particulars as designated emergency vehicle intercept points, evacuation routes and evacuation assembly areas. In cases where two or more groups share a common facility, emergency instructions must be coordinated.

Example instructions for selected emergencies are found in Appendix A.

IV. EMERGENCY RESPONSE COORDINATION

Groups WX-DO, WX-1, WX-3, WX-5, J-6, J-8, WX-11, WX-12, MEC-5, and M-1 conduct operations or have offices at S-Site. Since the greatest number of operations lie within the jurisdiction of Group WX-3, by agreement the WX-3 Group Leader or the person acting in his place will coordinate all emergency responses outside of facilities at S-Site with EMO. For emergencies involving facilities or operations under the jurisdiction of a group other than WX-3, the Group Leader or senior person present of the affected group will be called and will coordinate the emergency response with EMO.

During working hours, once evacuation is completed, first aid is initiated, and emergency response is activated, the senior person at the scene of the emergency calls the appropriate group office.

During working hours, WX-3 will provide a field observer with radio to aid in coordination if needed. This assistance should be requested by calling the WX-3 Group Leader at 7-6495.

After working hours, emergencies at S-Site will most likely be reported directly to the Laboratory's central alarm station by way of automatic alarms, a phone call to the 9-911 number or through the Protective Force radio net.

The central alarm station is provided with a first-level S-Site call out list consisting of the Division Coordinator for Operations, WX-3 Group Leader and Deputy Group Leader, and WX-12 Deputy Group Leader. In the event of an out-of-duty-hours emergency, the person called by the Central Alarm Station is responsible for responding in a manner appropriate to the degree of the emergency. Each person on the first level S-Site call-out list keeps a current copy of the detailed call-out list that covers all S-Site operations, readily available.

V. GROUP OFFICE RESPONSE

When notification of an emergency reaches a group office, the person receiving the call records it on the report form attached as Appendix B. The report is transmitted to the senior person present, who assumes responsibility as leader during the emergency.

The leader uses the check list, Appendix C as an aid in accomplishing those of the following responses that are appropriate to the emergency:

1. Confirms that aid is on the way.
2. Clears area paging system for emergency use.
3. Contacts site of emergency to learn what has occurred there.
4. Summons additional aid if needed.
5. Convenes staff (who are acquainted with operations at the site of the incident) at a safe location to aid in response planning and coordination.
6. Sends a field observer to the site of the incident.
7. Coordinates WX-3 radio support and field observer.
8. Notifies WX-DO.
9. Coordinates with Emergency Management Office (EMO).

To aid management of an emergency response, the following materials are maintained in the WX-3 Group Office and are available for emergency use:

1. A current S-Site map showing operating locations
2. A file of S-Site building floor plans
3. A current S-Site call-out list
4. A current list of S-Site radio net call signs and a radio
5. A current list of S-Site buildings denoting special hazards associated with each.

VI. SITE EVACUATION/NOTIFICATION

Should the emergency be so widespread as to require general or partial site evacuation, or be of such a nature as to require notification of all site personnel to remain inside buildings or restrict travel around the site, the WX-3 Group Office will coordinate notification of each building or building group. Provisions are made to assure that all operating buildings are notified with specific instructions. The decision to do so will be made by the line manager handling the emergency for S-Site operations in association with EMO and other emergency response personnel.

WX-3 will assist by giving appropriate instructions over the radio net with confirmation of receipt by radio response from each building. Buildings not equipped with radio communication or not responding to radio notification will be contacted by their group office by telephone to assure that all work areas are notified.

VII. REENTRY AND RECOVERY

Operating personnel will not reenter a damaged building until consent is given by both their group management and the EMO on-site coordinator present at the scene. In the event of severe structural damage, reentry may be prohibited until a safety study, conducted jointly by the Fire Department, the Facilities Engineering Division, the Safety Group, and the operating group has been completed and approved. Equipment damaged by fire or malfunction will not be restarted until a knowledgable person from the WX-12 Plant and Equipment Services Section, or the equipment vendor has given approval.

Essential to the prevention of future emergencies is an understanding of the cause of previous ones. Therefore, all personnel involved in direct responses to an emergency should take steps to protect evidence of the causes of an emergency. The affected Group Leader directs the investigation of causes as soon as practicable after the emergency is under control, and all S-Site personnel should cooperate in the work of official investigators.

VIII. PUBLIC INFORMATION

Information of any kind relating to an emergency at S-Site may be made public only through the Laboratory Public Affairs Office (PAO). All inquiries from the press should be referred to PAO at 667-6000. Radio transmissions are monitored by the general public; therefore, names of victims must never be transmitted by radio. Likewise, classified information must not be discussed on the radio.

IX. S-SITE EMERGENCY COMMUNICATIONS

Figure 1, summarizes S-Site emergency communications. Primary systems are fixed alarms, telephones, telephone activated "beepers" and the S-Site radio net. The S-Site radio net should serve as a backup emergency communications link except when site wide notifications are required. For widespread broadcast of emergency instructions, mobile public address systems in Protective Force vehicles can be activated through the Laboratory EMO or Central Alarm Station. S-Site has an administrative paging system that can be used to supplement emergency communication but should never be used as a primary communication link. Many operating buildings have internal paging systems which can also be used to supplement notifications but must not be relied on for primary communications.

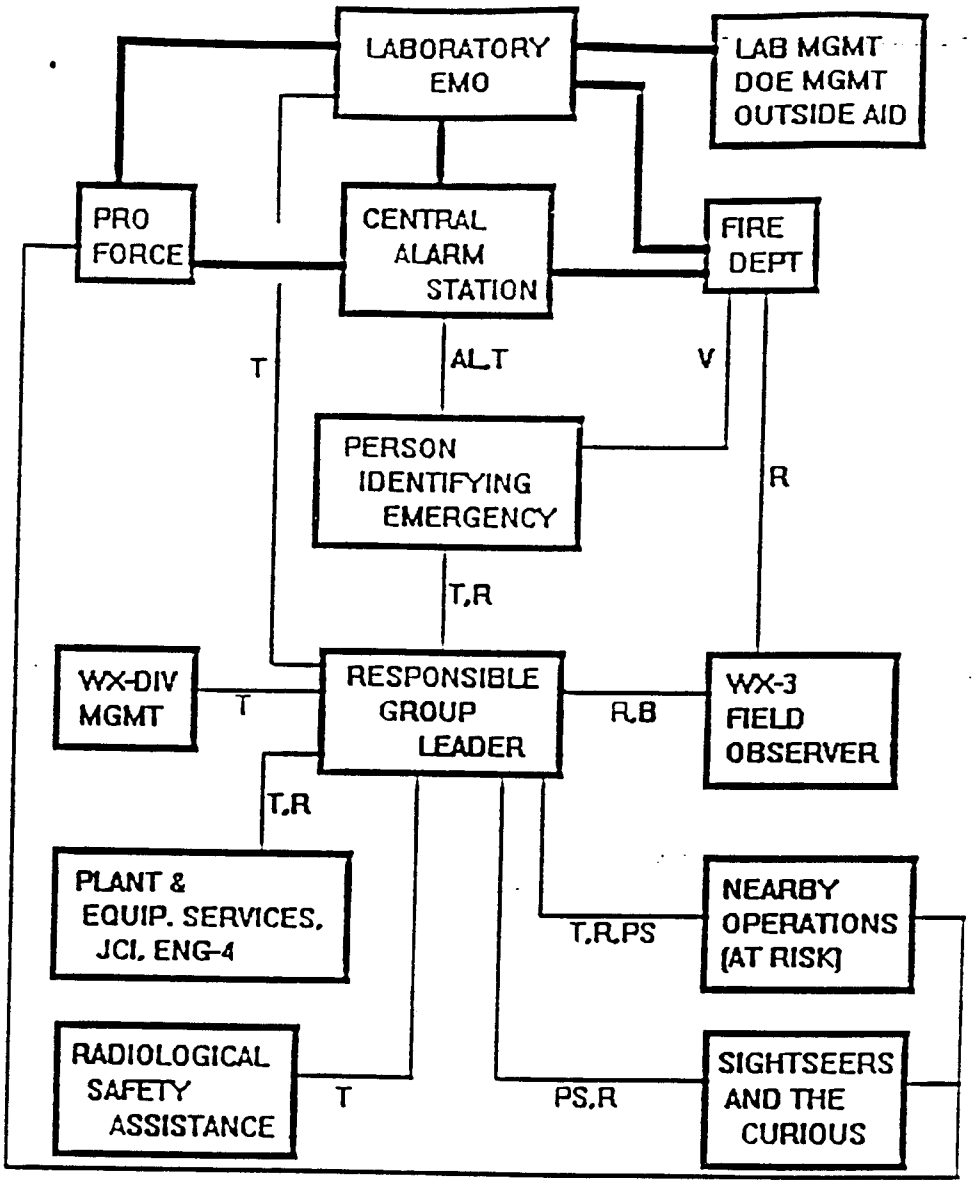
X. EMERGENCY RESPONSE TRAINING

Periodic emergency drills at each operating location are scheduled by the S-Site ES&H Subcommittee.

Employees new to S-Site are required to read the S-Site Emergency Plan and are briefed by the appropriate supervisor on the building emergency plans, and any special safety instructions (i.e., SOPs, EOPs, etc.) that apply to that area.

XI. REVIEW AND UPDATE OF S-SITE EMERGENCY PLAN

Annually, the permanent members of the S-Site ES&H Subcommittee or their designees will review this plan and coordinate needed additions or revisions. As part of this annual review, each Group Leader will ensure that emergency response instructions, are reviewed and the fact of the review noted on each set of instructions. The annual review of emergency planning will be included in the calendar of events issued by the S-Site ES&H Subcommittee. Emergency response instructions are subject of review during periodic safety inspections that are also scheduled and performed under the auspices of the S-Site ES&H Subcommittee.



COMMUNICATIONS KEY:
T: TELEPHONE
R: RADIO
B: BEEPER PAGE
V: VERBAL
PS: PAGING SYSTEM
MP: MOBILE PA SYSTEM
AL: AUTOMATIC AND PULL ALARMS

Laboratory Lines ▬▬
S-Site Lines ———

Figure 1. S-Site Emergency Communications.

APPENDIX A

EXAMPLE EMERGENCY INSTRUCTIONS

(TO BE CUSTOMIZED FOR EACH OPERATING LOCATION BY ADDITION OF EXPLOSION SHELTER DESIGNATION, MUSTER POINT EMERGENCY VEHICLE INTERCEPT POINTS, AND OTHER SPECIAL INSTRUCTIONS)

FIRE IN OR NEAR EXPLOSIVES

Person who discovers fire assumes command until relieved and does the following:

1. Assume detonation is imminent
2. Goes to evacuation assembly area, notifying others in vicinity to evacuate as well
3. Pull fire alarm on way to assembly area
4. From safe location, use local paging system, if available, to direct others in area to shelter or to evacuate
5. Dial 911/9-911
6. Account for all people known to have been at location of the fire
7. From shelter, using available remote control, shut down operations equipment in vicinity of fire
8. From shelter, dial your Group Office
9. Follow instructions from fire department and your line management

FIRE AWAY FROM EXPLOSIVES

Person who discovers fire assumes command until relieved and does the following:

1. Get out/get away from flame, smoke and gases
2. Pull fire alarm on way out

NEVER REENTER A SMOKE-FILLED ROOM OR BUILDING FOR ANY REASON

3. Dial 911/9-911, if telephone is safely accessible.
4. Warn others in area--shout, and use local paging system, if safely accessible.
5. Dispatch someone to meet and direct emergency vehicles.
6. Shut down operating equipment in vicinity of fire if switch is safely accessible.
7. Attack fire only if you can do so safely; use proper extinguisher.
8. Account for all people known to have been at location of fire.
9. Use telephone, if accessible and dial your Group Office.

SERIOUS INJURY OR ILLNESS

1. If alone, dial 911/9-911 for help, or pull fire alarm

2. Person who discovers injured or ill person should do the following:

   a. If an electrical accident, turn off power source or separate victim from conductor.

   b. Yell for help from others in area.

   c. Start CPR, if required.

   d. Dial 911/9-911 or pull fire alarm to summon ambulance.

   e. Start first aid

   f. Dispatch someone to meet and direct emergency vehicles.

   g. When victim has been attended to, dial your Group Office.

CHECKLIST

FIRE, EXPLOSION OR SERIOUS INJURY/ILLNESS

Person receiving the call does the following:

1. QUESTION THE CALLER/WRITE DOWN ANSWERS.

   Who is calling?_____

   Where are you? Site_____ Building_____

   What phone number are you calling from? _____

   Where is the emergency? _____

   What happened? _____

   Is anyone injured? _____

   Who? _____

   Have you called 9-911 for help? _____

2. FOLLOW UP WITH CALL TO 9-911 IF YOU THINK EMERGENCY MAY REQUIRE AMBULANCE OR FIRE TRUCKS.

3. SUMMON GROUP LEADER, DEPUTY OR ONE OF THE SECTION LEADERS.

4. COMPLETE THE FOLLOWING:

   Time call was received:_____

   Date: _____

   Your Name: _____

CHECKLIST

MOTOR VEHICLE ACCIDENT

Person receiving the call does the following:

1. QUESTION THE CALLER/WRITE DOWN ANSWERS.

   Who is calling?_____

   Where are you? Site_____ Building_____

   What phone number are you calling from? _____

   Where did the accident happen? _____

   Is anyone injured? _____

   Who? _____

   Have you called for ambulance? _____

   Will you be at this number? _____

   Where is the vehicle? _____

   Can the vehicle be driven? _____

2. FOLLOW UP WITH CALL TO 911/9-911 IF YOU THINK AMBULANCE MAY BE REQUIRED.

3. SUMMON GROUP LEADER, DEPUTY OR ONE OF THE SECTION LEADERS

4. IF A GOVERNMENT VEHICLE WAS INVOLVED:

   a. Call 7-7878 to report accident to Laboratory Safety Office.

   b. If accident was not on Laboratory property, dial 662-8222 to report accident to Los Alamos Police.

   c. If vehicle cannot be driven dial 7-5177 to request JCI wrecker.

5. COMPLETE THE FOLLOWING:

   Time call was received:_____

   Date: _____

   Your Name: _____

APPENDIX B

S-SITE EMERGENCY RESPONSE PLAN

EMERGENCY CALL REPORT

QUESTIONS TO CALLER

Who is calling?___ _____ _____

Where do you work?_____

Where are you?_____

What phone are you calling from?_____

Where is the emergency?_____

What happened?_____

_____

_____

Is anyone injured?_____

Who?_____

Have you called the Fire Department?_____

What are you going to do?_____

_____

_____

Will somebody be at that phone?_____

INSTRUCTIONS GIVEN TO CALLER:

_____

_____

_____

INFORMATION FOR RECORD:

Time call was received_____ Date_____

Person receiving call _____

APPENDIX C
S-SITE EMERGENCY RESPONSE PLAN
GROUP OFFICE RESPONSE CHECK LIST

		TIME ACCOMPLISHED
1.	Call Fire Department (9-911).	_____
2.	Call Group Leader or senior person of involved Group.	_____
3.	Summon nearby person for Group Office assistance.	_____
4.	Notify Emergency Management Office (7-6211)	_____
5.	Establish Field Observer, if needed	_____

A. Notify WX-3 Group Office that field observer is being requested. Senior member of involved group shall go to WX-3 Group Office for radio support.

B. Field Observer in radio equipped vehicle to the scene.

Primary: WX-3 Transporation Unit Supervisor or Alternate, Radio 567 or page 104-2047.

Back-up: Bill McCormick Certifying Agent, Radio 968 or 118-150.

C. Dispatch a senior member of involved Group to scene to serve as second Field Observer. _____

D. Announce over radio "To all stations; this is Station K-1 This is an emergency!" DO NOT BROADCAST unless necessary." REPEAT _____

E. NOTE: Field Observer Contacted

NAME_____ CALL NO._____ _____

F. Develop Field Liaison

1. Instruct Field Observer. "DO NOT discuss names or number of victims over radio; use the telephone for this. _____
2. Instruct one Field Observer to stay in vehicle and keep in contact with K-1. _____
3. Instruct second Field Observer to perform tasks as necessary to supply information to Group Office. _____

INFORMATION:_____

_____

_____

7. Call WX-Division Office at 7-4306 or 7-4136 _____

Upon conclusion of emergency:

a. Preserve scene for investigation _____

b. Reopen radio net for normal use _____

EMERGENCY PLAN

GROUP WX-3 BURNING GROUND

Original Issue: March 1973

Revised: April 1990

Approved by:

M. J. Barr — 5-18-90
M. J. Barr — Date

R. A. Hildner — 5-18-90
R. A. Hildner — Date

J. L. Parkinson — 5/21/90
J. L. Parkinson — Date

ACTION LIST

CALL FOR HELP	OPERATING HOURS NORMAL	OTH
FIRE	9-911	9-
AMBULANCE	9-911	9-
S-SITE FIRST AID OR OCCUPATIONAL MED (HSE-2)	7-6408	9-
UTILITY SHUTOFF	7-7848	
	7-6191	7-

CALL TO REPORT		
~~S-SITE EMERGENCY CONTROL CENTER (SSECC)~~	~~5-1024~~	
~~WX-3 GROUP LEADER~~	~~7-6895~~	~~662~~
~~WX-3 DEPUTY GROUP LEADER~~	~~7-6495~~	~~672~~
~~UNIT LEADER~~	~~7-6866~~	~~672~~
~~BURNING GROUND UNIT SUPERVISOR~~	~~7-6891~~	~~753~~
O.K. P & E SERVICES SECTION LEADER	7-1800	662

YOU SHOULD

EXECUTE YOUR EMERGENCY PLAN
ACCOUNT FOR YOUR PEOPLE
NOTIFY ~~SSECC~~ WX-3 Group office
STAND BY TO ASSIST EMERGENCY CREWS

YOU SHOULD NOT

RISK YOUR LIFE FOR ANY REASON
GO TO THE SCENE OF AN INCIDENT UNLESS TOLD TO DO SO
DISCUSS ANY INCIDENT ON THE RADIO OR IN OUTSIDE PHONE CALLS

CALL TO REPORT	NORMAL	OTHER
WX-3 GROUP OFFICE	7-6310	
WX-3 GROUP LEADER	7-6495	672-1359
WX-3 DEPUTY GROUP LEADER	7-6895	662-5924
WX-3 DEPUTY GROUP LEADER	7-6738	672-9150
SECTION LEADER	7-8335	672-1659
UNIT LEADER	7-6891	753-7494
ADD		

FIRE AWAY FROM EXPLOSIVES

Immediate Action

1. Person who discovers fire shall:

   a. Fight a small fire that you are sure you can handle.

   b. Get help for a fire that can get out of control and

      (1) Warn people nearby
      (2) Pull fire box if nearby
      (3) Call 9-911 and report where fire is, what is burning and your name.

   c. Notify the ~~SSBCC (5-1024)~~ WX-3 Group Office (7-6310)

2. Technical Supervisor shall:

   a. If fire is hazardous to occupants,

      (1) Order evacuation
      (2) Account for people

   b. Ensure that the Fire Department has been called.

3. Building occupants shall act on instructions of Technical Supervisor.

Follow Up

1. Person who fights fire shall:

   a. Ensure that it is completely out

   b. Wait for the Fire Department and tell them what has been done.

2. Technical Supervisor shall:

   a. Initiate first aid treatment, if necessary.

   b. Report to the ~~SSBCC (5-1024)~~ WX-3 Group Office 7-6310

   c. Cooperate with the Fire Department.

3. Building occupants shall act on instructions of Technical Supervisor.

FIRE OR ACCIDENTAL DETONATION

The Group WX-3 Burning Ground is so designed that HE fires, and even accidental detonations, are not of serious consequence provided that personnel are in designated locations when these events occur. The following procedure designates action to be taken in the event of detonations, premature fires, and similar emergency situations.

IMMEDIATE ACTION

The individual detecting the hazardous situation should:

1. Immediately evacuate the danger area and assist any injured co-workers, as necessary.

2. Seek protective cover in TA-16-389, Control Shelter.

3. Provide emergency first aid to injured co-workers, as necessary.

4. Call 9-911 and report where fire is, what is burning and your name.

5. Call the ~~SSECC (5-1024)~~ WX-3 Group Office for further instructions.

EVACUATION

1. Evacuation of the Burning Ground in emergency situations will probably not be required; however, the area may be evacuated at the discretion of the Technical Supervisor or upon such instructions by other supervisory personnel.

2. If the area is evacuated, proceed to area gate, Structure TA-16-349, to provide information to emergency personnel.

3. As soon as possible, provide detail information to Unit and Fabrication Section Leader.

4. Complete Accident/Incident Report with the original coming to the WX-3 Group Leader.

SERIOUS PERSONAL INJURIES

Immediate Action

1. Injured person shall:

   a. Call for help from people nearby.

   b. Notify the WX-3 Group Office (7-6310) ~~SSHOC (5-1031)~~.

   c. Go to the First Aid Station, Building TA-16-193, or Occupational Medicine, HSE-2, TA-3-409 for treatment, if able

2. Technical Supervisor shall:

   a. Direct someone to call the ambulance, if needed, and start first aid treatment.

   b. Direct someone to accompany injured person to First Aid Station.

   c. Direct other operators to shut down equipment operated by injured person.

   d. Report the injury to the WX-3 Group Office (7-63 ~~SSHOC (5-1031)~~.

3. Occupants shall:

   a. Assist injured person.

   b. Act on instructions of the Technical Supervisor.

Follow Up

1. Technical Supervisor shall:

   a. Correct cause of accident before work is resumed at site of accident.

   b. Report details of accident to the WX-3 Group Office ~~SSHOC~~ and Unit and Fabrication Section Leader.

   c. Complete Accident/Incident Report with the original coming to the WX-3 Group Leader.

APPENDIX D

Standard Operating Procedure
for
General Handling and Disposal of HE Contaminated Waste

ESA

STANDARD OPERATING PROCEDURE

FOR

PACKAGING AND COLLECTION OF HIGH EXPLOSIVES AND POTENTIALLY HIGH EXPLOSIVES CONTAMINATED WASTE MATERIAL FOR DISPOSAL

Prepared By:_____**Date**_____
Bart Olinger, Materials Team, ESA-WMM

Approved By:_____**Date**_____
D. A. Hemphill, Materials Team Leader, ESA-WMM

Approved By:_____**Date**_____
L. A. Stretz, Group Leader, ESA-WMM

Approved By:_____**Date**_____
Roger H. Goldie, ESA-FM/ESH-5

Los Alamos
National Laboratory

CONTROLLED DOCUMENT

*Users have the ultimate **responsibility to ensure that** they are working **with the latest revision of the** controlled document.*

1.0 SCOPE

This SOP governs the packaging and collection procedures for high explosives (HE) wastes and wastes potentially contaminated with HE which must be collected and disposed by ESA-WMM HE disposal personnel. Potentially HE contaminated waste is waste material that has been in direct contact with HE or has visible HE contamination on it. Tests for HE contamination can be done by an authorized certifying agent. Waste materials originating in other groups will be packaged according to this SOP before being processed by ESA-WMM disposal personnel. Most wastes covered by this SOP are considered hazardous and Resource Conservation and Recovery Act (RCRA) requirements apply.

2.0 LOCATION

2.1 All buildings in which HE is handled within the S-Site Explosives Area. These facilities have satellite storage areas for storing HE and potentially HE contaminated waste. The wastes must not accumulate at the satellite storage area to quantities greater than a volume of 55 gallons or 800 pounds maximum.

2.2 Other Laboratory sites requiring disposal services by ESA-WMM disposal personnel.

3.0 EQUIPMENT

3.1 Disposal cans, safety style
3.2 55 gallon oil drums
3.3 Oily waste receptacles (UL-approved)
3.4 Dumpsters
3.5 Cardboard boxes
3.6 Reinforcing cardboard flats
3.7 Colson carts

4.0 MATERIALS

4.1 Plastic bags
4.2 Masking tape
4.3 Cushioning material
4.4 Paper bags
4.5 Cardboard boxes

5.0 GENERAL INSTRUCTIONS

5.1 Packaging

The following rules apply to the packaging of all HE contaminated waste materials:

5.1.1 Waste that is wet with oil, solvents, or water will be absorbed in some medium and placed in a plastic bag and boxed. A 55 gallon drum containing absorbent may also be used. Waste in cardboard boxes will be placed in an appropriate container in the designated satellite storage area

5.1.2 The contents of the containers must be clearly identified. Permanent type receptacles, such as Dumpsters, drums, garbage cans, and disposal cans, will have the contents intended stenciled on their sides. Cardboard boxes containing potentially HE contaminated waste, other than scrap HE, must have their contents identified on the outside. Identification by a marking pen is sufficient. Boxes containing scrap HE must have an explosives scrap record card (Form WX-3-41) attached to the outside. The card shall be filled out as completely as possible, in regard to the cost account, source, type and approximate weight of the contents. All receptacles containing wastes regulated by the Resource Conservation & Recovery Act (RCRA) must have the words "Hazardous Waste" posted on the outside.

5.1.3 If more than one large piece of scrap HE is placed in a box some type of cushioning material such as Kimpak, must be placed between the pieces in such a manner that rubbing or colliding cannot occur during transportation.

5.1.4 Pressed and cast HE scrap will be placed in separate boxes. A reinforcing piece of cardboard shall be placed in the bottom of cardboard boxes containing scrap HE All cardboard boxes shall be closed and the lid securely taped.

5.1.5 Pieces of HE scrap that weigh over 50 pounds shall be placed in a suitably sized HE transportation container that has a lid that can be securely closed.

5.1.6 HE scrap with boosters or metal attachments will be labeled and packaged separately from other explosives.

5.2 Collection and Transportation

5.2.1 Non-hazardous waste also free of HE contamination is to be deposited in the designated Dumpsters outside the principle buildings in the area. Before the contents of these Dumpsters are picked up for disposal as municipal waste, a certification must be given to the driver that the contents are free of HE contamination by an authorized certifying agent.

5.2.2 The collection crew shall be instructed in, and expected to follow, the applicable portions of SOP Chapters 12, 13, and 14.

5.2.3 The collection of potentially HE contaminated waste materials and scrap HE from designated pickup points within the S-Site Explosives Area will be scheduled by the disposal personnel on a basis of good housekeeping policy. A periodic inspection of all active pickup points will be made by the building personnel to ensure that there is no unsafe, untidy buildup of materials at any waste storage point and that the quantity remains below the 55 gallon limit. The disposal personnel will be notified when needed.

5.2.4 Waste material contaminated with explosives and located within the TA-16 exchange area will be loaded and transported to the burning ground by trained disposal or other personnel authorized by the ESA-WMM disposal team.

5.2.5 Combustible trash potentially contaminated with HE will be picked up and transported to the Burn Ground incinerator by the disposal personnel when notified. A waste profile must be available at the time of pickup.

5.3 HE and HE Contaminated Waste Packaging and Storage

5.3.1 Potentially **HE** Contaminated Waste

Potentially **HE** contaminated waste will be segregated as combustible and non-combustible and stored in the satellite storage areas in labeled containers. Waste profiles of the contents of the containers stored there will be kept current.

5.3.2 Scrap Explosives

All scrap **HE**, except settling tank waste, will be packaged in cardboard boxes. **HE** machining waste that cannot be flushed into the settling tank will be placed in a plastic bag or suitable container and packaged in cardboard boxes.

5.3.3 Scrap MDF

All scrap MDF will be kept separate from other **HE** scrap. Scrap MDF will be packaged in cardboard boxes. Lengths of MDF that are too long to fit may be coiled into a cardboard box for disposal at the Burn Ground.

5.3.4 Scrap Extrudable Explosives

Bulk extrudable explosives, and experimental plastic test devices containing extrudable explosives, will be kept separate from other **HE** scrap and packaged in plastic bags before they are placed in cardboard boxes. Test devices will be wrapped with Kimpak to prevent them from coming into contact with each other.

5.3.5 **HE** Contaminated Solvents

5.3.5.1 Flammable solvents, including toluene, acetone, and alcohol, will be poured into red disposal cans or 55 gallon drums stenciled FLAMMABLE.

5.3.5.2 Halogenated hydrocarbons, such as trichloroethylene and methyl chloroform (chlorothene) will be poured into white disposal cans stenciled NONFLAMMABLE.

5.3.5.3 Dimethylsulfoxide (DMSO) will be poured into disposal cans stenciled "DMSO only."

5.3.5.4 **HE** contaminated solvents, both combustible and non-combustible, will be burned or flashed in accordance with the appropriate section of SOP 12.3.4.

5.3.6 Floor Sweepings

Potentially **HE** contaminated floor sweepings will be stored with the combustible waste in the satellite storage area.

5.3.7 Potentially **HE** Contaminated Oils

5.3.7.1 Used hydraulic fluids drained from explosive processing equipment and oils, such as Way-lub, vacuum oil, and oils collected from sumps and drip pans, will be stored in disposal cans or 55 gallon drums and placed in the designated satellite storage area.

5.3.7.2 ESA-WMM maintenance personnel will identify each container, or group of containers if the material has a common source, with an identifying number, and will record the source, the type of fluid or oil, and date of collection.

5.3.8 Oily Rags

Each equipment room in the Explosives Area is equipped with an oily waste receptacle. Potentially **HE** contaminated oily rags will be placed in these receptacles. The rags will be packaged in a cardboard box and placed in designated satellite storage area for disposal.

5.3.9 Large Non-Combustible **HE** Contaminated Items

Potentially **HE** contaminated, non-combustible hardware, fixtures, furniture, and equipment that cannot be made **HE**-free with certainty must be heat treated on the flash pad, TA-16-387. Such waste picked up or delivered to the flash pad for treatment must be accompanied with a waste profile.

5.3.10 Residual Ashes

The residual ash that remains on a burning pad after a burn will be disposed of as described in SOP 12.1.0.

5.4 Records

All pickups of scrap **HE** and potentially **HE** contaminated materials will be recorded and stored at the Burn Ground, TA-16-389, along with waste profiles and disposal request forms.

PACKAGING AND COLLECTION OF WASTE MATERIAL FOR DISPOSAL

Page 1, Revision 14	Page 5, Revision 18
Page 2, Revision 16	Page 6, Revision 17
Page 3, Revision 16	Page 7, Revision 11
Page 4, Revision 17	Page 8, Revision 7

APPROVED _____ DATE 8-3-87
M. J. Barr

APPROVED _____ DATE 8-3-87
R. A. Hildner, Assoc. Grp. Leader, WX-3

APPROVED _____ DATE _____
J. L. Parkinson, Group Leader, WX-3

APPROVED _____ DATE 8/5/87
W. A. Bradley, Asst. Division Leader, WX

APPROVED _____ DATE 10/27/87
~~A. M. Valentine, Group Leader, HSE-1~~
R. A. Koenig, Group Leader, HSE-7

APPROVED _____ DATE 11/16/87
W. C. Courtright, Group Leader, HSE-3

ESA

STANDARD OPERATING PROCEDURE

FOR

DISPOSAL OF HE CONTAMINATED MATERIALS AND SCRAP HE ORIGINATING IN OTHER LABORATORY GROUPS

Prepared By:_____**Date**_____
C. W. Sandoval, ESA-WMM

Approved By:_____**Date**_____
D. A. Hemphill, Team Leader
Materials Section, ESA-WMM

Approved By:_____**Date**_____
L. A. Stretz, Group Leader, ESA-WMM

Approved By:_____**Date**_____
Roger Goldie, Safety Officer, ESA-FM/ESH-5

1.0 SCOPE

This SOP governs the disposal by Group HE-contaminated materials and scrap HE originating in other Laboratory groups. This does not include HE settling tank waste, which is covered in SOP 12.1.4.

2.0 DISPOSAL REQUEST FORM (ESA-2-233)

This form (see attached) must be filled out and sent to the Materials Team Leader before materials designated for disposal at the burning ground can be picked up. In the case of materials to be received from <90 day storage areas, this form must be submitted at least 30 days before 90 day period has expired or the Disposal Unit will not guarantee disposal before the deadline.

3.0 PACKAGING

The requesting group will be required to package all materials for pickup in accordance with SOP 12.1.2. Approved packaging, boxes, and containers are available on request from the Transportation Unit.

4.0 INSTRUCTIONS TO DISPOSAL SERVICE MANAGER

There is a space on the form for special instructions to the Disposal Unit Leader. When the Disposal Unit Leader determines that the material may be disposed of at the burning ground, he will write any special instructions needed for disposal in the space provided on the form. The Disposal Unit Leader may then have the material picked up. If disposal is not allowed, the Unit Leader will notify the requester.

After the material is disposed of at the burning ground, the form will be dated and kept at least six months by the Disposal Unit Leader.

Form: ESA-2-233
revised December 1, 1995

DISPOSAL AT ESA BURNING GROUND

This form must be filled out and sent to the ESA-WMM Materials Team Leader, Mail Stop C930 before materials designated for disposal at the ESA Burning Ground can be picked up. In the case of materials to be received from 90 day Storage Areas, this form ***must be submitted at least 30 days before 90 day period expires*** or the ESA Disposal Unit will not guarantee disposal before the deadline.

DATE:_____

Requester:_____ Group_____ Phone_____

Charge Code_____ Cost Code_____ Work Pkg_____

1. High Explosive (HE) Scrap
   Type_____
   _____
   _____
   History_____
   _____
   _____
   _____

Approx Weight_____ **Approx. Volume**_____

2. HE Contaminated Materials*
   Type_____
   _____
   _____
   History_____
   _____
   _____
   _____

3. Special Instructions to Disposal Unit Leader (***not be be completed by requester)***_____
   _____
   _____

Approved_____ **Date**_____
Materials Team Leader

Date of Disposal_____

*All HE contaminated materials must be certified non-radioactive by ESH-1 RCT and be free of lead, beryllium, oil, PCBs and asbestos.

DISPOSAL OF HE CONTAMINATED MATERIALS AND SCRAP HE ORIGINATING IN OTHER LABORATORY GROUPS

Page 1, Revision 4
Page 2, Revision 0

SUBMITTED W. M. Mathieson DATE 3/26/86
W. M. Mathieson, Assoc. Group Leader, WX-3

APPROVED W. L. May DATE 3/26/86
J. L. Parkinson, Group Leader, WX-3

APPROVED Wm. A. Bradley DATE 3/27/86
W. A. Bradley, Asst. Division Leader, WX

APPROVED NOT REQUIRED DATE
A. M. Valentine, Group Leader, HSE-1

APPROVED Jack L. Beckstaw (For) DATE 5/29/86
W. C. Courtright, Group Leader, HSE-3

GENERAL RULES FOR DISPOSAL OPERATIONS

The following pages of Group GMX-3 SOP 12.3.0 are now obsolete, and should be removed from the manual:

Page 1, Page Revision 3
Page 2, Page Revision 4
Page 3, Page Revision 4
Page 4, Page Revision 4
Page 5, Page Revision 5
Page 6, Page Revision 4
Page 7, Page Revision 1 - Obsolete
Page 8, Page Revision 0 - Obsolete

Appropriate items that were covered in this SOP are now covered in GMX-3 SOP 12.1.0, General Rules for Disposal Operations.

Submitted: J. B. Panowski Date 7/14/7
J. B. Panowski

Approved: C. R. West Date 8-5-71
C. R. West

FILE THIS PAGE IN THE MANUAL

ESA

STANDARD OPERATING PROCEDURE

FOR

GENERAL RULES FOR DISPOSAL OPERATIONS

Prepared By:_____**Date**_____
C. W. Sandoval, ESA-WMM

Approved By:_____**Date**_____
Douglas A. Hemphill, Team Leader
Materials Section, ESA-WMM

Approved By:_____**Date**_____
L. A. Stretz, Group Leader, ESA-WMM

Approved By:_____**Date**_____
Roger Goldie, Safety Officer, ESA-FM/ESH-5

Los Alamos
National Laboratory

CONTROLLED DOCUMENT

Users have the ultimate responsibility to ensure that they are working with the latest revision of the controlled document.

Copy Number

1.0 SCOPE

This SOP contains rules and regulations that apply at all times to all persons involved with ESA disposal operations. The disposal operations are under the jurisdiction of the ESA-WMM Materials Section and are supervised by the Disposal Unit Supervisor. The disposal facilities are to be used for destruction by burning of combustible industrial waste and scrap HE generated in LANL operations and treating wastewater from HE processing operations. Some waste and scrap HE from other Laboratory groups may be disposed of in accordance with SOP 12.4.1.

The Disposal Unit Supervisor refers to that person or a qualified designee fully trained in accordance with this SOP.

2.0 LOCATIONS

2.1 TA-16-388, 394, and 399 Burning Trays

2.2 TA-16-387 Flash Pad

2.3 TA-16-386, Storage Area

2.4 TA-16-401 and 406 Filters Vessels

2.5 TA-16-402 Air Heater

2.6 TA-16-389 Control Shelter

2.7 TA-16-349 Gate, Structure

2.8 TA-16-1409, ESA Incinerator Located at Burning Ground

2.9 TA-9, TA-11, TA-14, TA-16, TA-22, and TA-40 HE settling tanks

2.10 TA-16-363, Waste Water Treatment Facility

3.0 LIMITS

3.1 Personnel

3.1.1 Nine (9) persons are permitted inside the burning ground area provided that no specific area is in excess of the posted limits.

3.1.2 Specified limits for particular disposal operations are given in the ESA SOP that pertains to the operation.

3.2 Explosives

Reference ESA SOP 12.1.2 for particular disposal operation.

4.0 ALLOWABLE EXPLOSIVES

Any explosive material listed in ESA SOP 1.1.0, Tables 1 and 2 and any experimental explosives/components listed in active High Explosives Development Procedures and Authorizations (HEDs).

5.0 TRAINING AND SAFETY APPAREL

5.1 Personnel engaged in explosives disposal activities will be thoroughly trained in the hazards involved in handling, transporting, disposing of explosives, and in the precautions necessary for personnel protection. Personnel will be expected to understand the intent of the SOPs and to conduct themselves accordingly.

5.2 All personnel involved in disposal operations will be instructed in, and are expected to follow, the applicable portions of ESA SOPs Chapters 1, 12, 13, and 14.

5.3 Operators who are engaged in disposal operations at the burning ground will wear coveralls, industrial safety shoes, appropriate eye protection, gloves and respirators when necessary.

6.0 BURNING GROUND GENERAL OPERATING RULES

6.1 The Disposal Unit Supervisor has custody of the blasting machine and squibs. In his absence, this custody may be delegated to an alternate.

6.2 At the end of any disposal operations, all tools and equipment are to be returned to their proper storage places.

6.3 No more than two people are permitted to ride in a truck hauling explosives, and both of them must be in the cab.

6.4 During winter operations, the Disposal Unit Supervisor will check the roads, turn outs, and parking areas of the burning ground to make sure their condition is satisfactory for HE trucks. Roads will be maintained in a condition to allow passage of explosives-carrying vehicles with no more than the normal traffic hazards.

If conditions are marginal, the Disposal Unit Supervisor will notify the Area Manager and request immediate service to clean the roads. HE Trucks will not be driven over these roads until they are, in the Disposal Unit Supervisor's judgment, clear. Tire chains may be used on trucks transporting HE, at the Disposal Unit Supervisor's discretion.

6.5 The gate, Structure 349, on the access road will be closed by the burn ground crew before explosives disposal operations begin at the burn ground. When the gate is closed during normal operating hours, approval for entrance to the burn ground may be obtained by telephoning the Disposal Unit Supervisor. If for any reason the gate must be closed during non-operating hours, or on weekends or holidays, the Disposal Unit Supervisor will notify the Materials Team Leader. The Team Leader will notify Security personnel of the gate closing.

6.6 Scrap metal will not be allowed to accumulate on burning pads, except as allowed for the flashing of unburnable materials (ESA SOP 12.3.6). The Disposal Unit Supervisor will inspect each pad after each burning operation. Remaining scrap-metal will be removed, and when a convenient quantity of scrap has accumulated it will be disposed of in a suitable landfill in accordance with CST-7 procedures.

6.7 Operations ***will not*** be conducted at the burn ground during the approach of or an actual electrical storm. Control Shelter 389 is considered a safe area during electrical storms.

6.8 No more than two persons are to be involved in setting the ignition train and squibs when preparing to make a burn. Other personnel at the burn ground will remain in Control Shelter 389 during this operation. All personnel will be in Control Shelter 389 when an ignition train is fired. All personnel who are superfluous to the operation will have been sent out of the area. The number of people exposed to the hazard will be kept to a minimum and within the personnel limits established in the SOP for the specific disposal operation.

6.9 All personnel in Control Shelter 389 during the burning operation will remain there until all explosives have been reduced to a smoldering condition.

6.10 When a brush fire is created as the result of a burning operation, the Disposal Unit Supervisor will immediately notify the Fire Department and the ESA Group Office.

6.10.1 If it can be determined that explosives are not involved in the fire, the Disposal Unit Supervisor will immediately send someone to the entrance gate (Structure 349) to admit the Fire Department.

6.10.2 If explosives are involved in the fire, all personnel will remain in Control Shelter 389 until the Disposal Unit Supervisor has been instructed by the Group Office in the procedure to be followed.

6.11 In the case of a detonation during the burning of explosives, the Disposal Unit Supervisor will immediately notify the Materials Team Leader and the ESA-WMM Group Office. All personnel will remain in Control Shelter 389 until the Disposal Unit Supervisor has been instructed by the Team Leader or Group Office in the procedure to be followed.

6.12 Personnel must not step on explosives, and precautions must be taken at all times to prevent spilling or scattering of HE.

6.13 Blasting caps, electric detonators, and HE units containing electric detonators or MDF with boosters will not be destroyed at the burning ground.

6.14 HE pieces that contain metal or other materials that could produce shrapnel will not be burned at the burning ground.

6.15 Explosives machining slurry waste will be burned only on the filter vessels. HE machining waste that is brought to the burning ground in boxes will be disposed of in accordance with ESA SOP 12.1.4.

6.16 Postponement of a Burning Operation

Should an unexpected windstorm or other event prevent the burning of dry scrap HE after it has been spread, the following procedure will be used:

6.16.1 The Materials Team Leader will be notified that the burn cannot proceed.

6.16.2 Classified items will be removed from the pit in the following manner:

6.16.2.1 An explosives truck will be parked outside the entrance gate to the burn tray and the motor turned off.

6.16.2.2 The classified items will be repackaged at the pad and identification cards (Form WX-3-41) placed on the containers.

6.16.2.3 The containers will then be placed in the truck and transported to a magazine for storage.

6.16.2.4 Unclassified materials will be left on the burn tray and covered if possible. The gate to the burn tray will be closed and padlocked. The gate, Structure 349, will be closed.

6.16.2.5 The Disposal Unit Supervisor will inform Security personnel that security checks cannot be made beyond the gate, Structure 349, until further notice from ESA-WMM.

6.16.2.6 The HE scrap will be burned as soon as weather conditions permit.

6.17. All radio transmitters at the burn ground must be turned off when squibs are being handled and may not be turned on until the squibs have been fired or returned to storage.

6.18 The ash that remains after waste treatment at the burn ground is to be disposed of in the following manner.

6.18.1 All residual ash known or suspected of being contaminated with hazardous constituents will be collected and stored in special containers. These containers will be placed in the "less than 90 day" hazardous waste storage site. Suspect ash will be sampled and analyzed for hazardous components. Ash that is hazardous waste will be disposed of by CST through standard channels.

6.18.2 Non-contaminated ash will be collected and stored in containers designated for that purpose. The ash will be held at the Burn Ground until a convenient quantity exists, then appropriate CST waste disposal procedures will be followed.

6.19 Sump fluids either treated (barium processing) or untreated (normal HE processing) will be processed through the filter vessels (TA-16-401 and

406) per SOP 12.1.4. Effluent from the filters is passed through the wastewater treatment facility (TA-16-363) before exiting to the environment. Operation of the wastewater treatment facility is addressed in SOP 12.2.1.

GENERAL RULES FOR DISPOSAL OPERATIONS

Page 1, Revision 3
Page 2, Revision 3
Page 3, Revision 3
Page 4, Revision 3
Page 5, Revision 3
Page 6, Revision 3

APPROVED M. J. Barr DATE 10-28-87
M. J. Barr, Unit Supervisor

APPROVED R. A. Hildner DATE 10-28-87
R. A. Hildner, Section Leader, WX-3

APPROVED J. L. Parkinson DATE 10/29/87
J. L. Parkinson, Group Leader, WX-3

APPROVED Wm. A. Bradley DATE 11/2/87
W. A. Bradley, Asst. Division Leader, WX

APPROVED NOT REQUIRED DATE
A. M. Valentine, Group Leader, HSE-1

APPROVED Jack L. Bacastow for W.C.C. DATE 1/7/88
W. C. Courtright, Group Leader, HSE-3
RBG 12/23

TABLE 1

ESTABLISHED EXPLOSIVES AT TA-16
NOMINAL COMPOSITIONS

Name or Code	Composition
Al ANFO[a]	Ammonium nitrate/fuel oil/aluminum power
AN	Ammonium nitrate
ANFO	Ammonium nitrate/fuel oil
Baratol	76 wt% Barium nitrate/24 wt% TNT
BDNPA	Bis(dinitropropyl) acetal
BDNPF	Bis(dinitropropyl) formal
Black powder	74 wt% Potassium nitrate/15.6 wt% charcoal/ 10.4 wt% sulfur
Boracitol	60 wt% Boric acid/40 wt% TNT
BTX[b]	5,7-Dinitro-1-picrylbenzotriazole
Composition A-3	91 wt% RDX/9 wt% beeswax

[a]For transportation only to and from M- and WX-Division Groups and storage by Group WX-3.
[b]See HED-037, For Transportation Only.
*General revision of Table 1.

Table 1 (Cont)

Name or Code	Composition
Composition A-4	97 wt% RDX/3 wt% beeswax
Composition A-5	98.5 wt% RDX/1.5 wt% beeswax
Composition B and B-3	60 wt% RDX/40 wt% TNT
Composition C-3	88 wt% RDX/12 wt% wax
Composition C-4	91 wt% RDX/2.1 wt% polyisobutylene/1.6 wt% motor oil/5.3 wt% di(2-ethylhexyl) sebacate
Cyclotol, 75/25	75 wt% RDX/25 wt% TNT
Cyclotol, 70/30	70 wt% RDX/30 wt% TNT
DATB	Diaminotrinitrobenzene
DBA-1[a]	$AN/NaNO_3/TNT/H_2O$/thickener
Detasheet C	63 wt% PETN/8 wt% NC/29 wt% elastomeric binder
Detasheet D	75 wt% PETN/25 wt% elastomeric binder
	Note: Although this material may be red in color, it is an explosive and not an inert material.

[a]For transportation only to and from M- and WX-Division Groups and storage by Group WX-3.

Table 1 (Cont)

Name or Code	Composition
DINGU	Dinitroglycoluril
DNPA	2,2-Dinitropropyl acrylate polymer
DNT	Dinitrotoluene
EDC-8[a]	76 wt% PETN/24 wt% Silicone rubber, MS 2420
EDC-28[b]	94 wt% RDX/6 wt% FPC 461
EDC-32[c]	85 wt% HMX/15 wt% Viton A
EDC-37[d]	91 wt% HMX/1 wt% nitrocellulose/8 wt% K-10 liquid
*EDC-38[e]	94.5 wt% HMX/3.5 wt% K-10 Liquid/2 wt% Polyurethane
HBX-1	40 wt% RDX/38 wt% TNT/17 wt% Al/5 wt% Wax/0.5 wt% $CaCl_2$

[a]EDC-8 is the United Kingdom's version of XTX-8003
[b]EDC-28 is the United Kingdom's version of PBX 9407
[c]EDC-32 is the United Kingdom's version of LX-04.
[d]For shipping, storage, and experimental evaluation of quantities less than 5 g and for assembly of finished charges into test devices only.
[e]For shipping, storage, and analytical evaluation of molding powder and assembly of finished pieces into test devices.

*Item added to Page.

APPROVALS:

Larry E Hatler M-1	4-17-86 Date
4/5/13 M-DO	5/13/86 Date
WX-3	5/9/86 Date
HSE-3	5/21/86 Date

Table 1 (Cont)

Name or Code	Composition
High Energy Propellants[a]	Solid propellants generally used in missile systems
HMX	Cyclotetramethylenetetranitramine
HNS	Hexanitrostilbene
K-10[b]	65.3 wt% dinitroethylbenzene/34.7 wt% trinitroethylbenzene
LX-04	85 wt% HMX/15 wt% Viton A
LX-07	90 wt% HMX/10 wt% Viton A
LX-14	95.5 wt% HMX/4.5 wt% Estane 5702 F-1
Methane/oxygen[b]	Explosive mixtures of methane and oxygen gases
NC	Nitrocellulose, cellulose nitrate
Nitrometnane	Nitromethane
NQ	Nitroguanidine
NTO*	1,2,4-nitro-triazole-5-one
Octol	75 wt% HMX/25 wt% TNT
PBX-9001	90 wt% RDX/8.5 wt% polystyrene/1.5 wt% dioctyl phthalate

*Item added.

[a]After approval by the Explosives Development Committee.
[b]For shipping, storage, and experimental evaluations on less than 5-g quantities.

Submitted: [signature] Date 5/1/87

APPROVALS:

[signature] M-1 — 5/1/87 DATE

[signature] WX-3 — 5/6/87 DATE

[signature] M-DO — 5/6/87 DATE

[signature] HSE-3 — 5/18/87 DATE

Table 1 (Cont)

Name or Code	Composition
PBX-9007	90 wt% RDX/9.1 wt% polystyrene/0.5 wt% dioctyl phthalate/0.4 wt% resin
PBX-9010	90 wt% RDX/10 wt% Kel-F 3700 elastomer
PBX-9011	90 wt% HMX/10 wt% Estane 5703 F-1
PBX-9205	92 wt% RDX/6 wt% polystyrene/2 wt% dioctyl phthalate
PBX-9206	92 wt% HMX/8 wt% Kel-F 3700 elastomer
PBX-9401	94.2 wt% RDX/3.6 wt% polystyrene/2.2 wt% trioctyl phosphate
PBX-9404	94 wt% HMX/3 wt% nitrocellulose/3 wt% chloroethyl phosphate
PBX-9405	94 wt% RDX/3 wt% nitrocellulose/3 wt% chloroethyl phosphate
PBX-9407	94 wt% RDX/6 wt% Exon 461
PBX-9501	95 wt% HMX/2.5 wt% Estane/2.5 wt% BDNPA/F
PBX-9502	95 wt% TATB/5 wt% Kel-F 800
PBX-9503	80 wt% TATB (Class 2)/15 wt% HMX (Class 2)/5 wt% Kel-F 800
PBXW-113	88 wt% HMX/12 wt% rubber/plasticizer binder

Table 1 (Cont)

Name or Code	Composition
Pentolite	50 wt% PETN/50 wt% TNT
PETN	Pentaerythritol tetranitrate
Picric Acid	Du Pont 85 wt% pure
*PYX	2,6-Bis(picrylamino)-3,5-dinitropyridine
RDX	Cyclonite, cyclotrimethylenetrinitramine
Smokeless Powder (Single Base)	Standard military grades. Single or multi-perforated grains of colloided nitrocellulose. Stabilizers, plasticizers, inorganic nitrates, and other modifying agents may also be present.
Smokeless Powder (Double Base)	Standard military grades. Single or multi-perforated grains of colloided nitrocellulose containing nitroglycerin or nitroglycol. Stabilizers, plasticizers, inorganic nitrates, and other modifying agents may also be present.
STRATABLAST C[a]	Slurry blasting explosive
TAGN[b]	Triaminoguanidine nitrate
TAL-1005E[a]	Slurry blasting explosive

*Item added to previous revision.
[a]For transportation only to and from M- and WX-Division Groups and storage by Group WX-3.
[b]For shipping, storage, and experimental evaluation on less than 5-g quantities.

Table 1 (Cont)

Name or Code	Composition
TATB	Triaminotrinitrobenzene
Tetryl	2,4,6-Trinitrophenylmethylnitramine
TNS	Trinitrostilbene
TNT	Trinitrotoluene
TNT/NC	80 wt% TNT/20 wt% NC
*TPM	Tripicrylmelamine
Tritonal	80 wt% TNT/20 wt% aluminum powder
XTX-8003	80 wt% Recrystallized PETN/20 wt% Sylgard 182
XTX-8004	80 wt% RDX/20 wt% Sylgard 182

*Item added to page.

APPROVALS:

M-1	6/22/87 Date
6/24/87 M-DO	6/24/87 Date
WX-3	6/25/87 Date
Jack L. Bacchus For W.C.C. HSE-3	7/7/87 Date

TABLE 1

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Page 7, Page Revision 0
Page 8, Page Revision 0

Submitted: SE Hatler Date 3/10/86

Georgia J. Fritz Date 3/9/86

APPROVALS:

G. E. Larson M-1 3/12/86 Date

L A Gritzo M-DO 3/26/86 Date

W C Maas WX-3 3/28/86 Date

N C Cardona HSE-3 5/1/86 Date

Wm. A. Bradley WX-DO 3/28/86 Date

TABLE 2

DEVELOPMENTAL EXPLOSIVES AT GROUP ~~GMX-3~~ WX-3*

The explosives listed in this table have been approved for development according to the procedures in "Group ~~GMX-3~~ WX-3 High Explosives Development Procedures and Authorization". Any limitations or special instructions relative to these explosives, other than those contained in the ~~GMX-3~~ WX-3 SOP's, will be found in the referenced High Explosives Development Proposal (HED). Any such limitations or instructions must be observed in addition to, and in the same manner as, those in the appropriate SOP's.

Experimental Code Number	Nominal Composition Weight Percent	Reference HED	Weight Limit
X-0001	86.1 HMX/13.9 Indowax 170/175	001	5 pounds
X-0002	89.2 HMX/10.8 Indowax 170/175	001	5 pounds
X-0003	92.1 HMX/7.9 Indowax 170/175	001	5 pounds
X-0004	94.9 HMX/5.1 Indowax 170/175	001	5 pounds
X-0005	97.5 HMX/2.5 Indowax 170/175	001	5 pounds
X-0006	82.6 HMX/17.4 Estane 5740X-2	001	5 pounds
X-0007	86.4 HMX/13.6 Estane 5740X-2	001	1500 pounds
X-0009	93.4 HMX/6.6 Estane 5740X-2	001	1500 pounds
X-0010	96.8 HMX/3.2 Estane 5740X-2	001	5 pounds
X-0011	82.6 HMX/17.4 CPR-1-46A	001	5 pounds
X-0012	86.4 HMX/13.6 CPR-1-46A	001	5 pounds
X-0013	90.0 HMX/10.0 CPR-1-46A	001	5 pounds
X-0014	93.4 HMX/6.6 CPR-1-46A	001	5 pounds
X-0015	96.8 HMX/3.2 CPR-1-46A	001	5 pounds
X-0016	82.6 HMX/17.4 CPR-1-46C	001	5 pounds
X-0017	86.4 HMX/13.6 CPR-1-46C	001	5 pounds
X-0018	90.0 HMX/10.0 CPR-1-46C	001	5 pounds
X-0019	93.4 HMX/6.6 CPR-1-46C	001	5 pounds
X-0020	96.8 HMX/3.2 CPR-1-46C	001	5 pounds

*Title changed from Page Revision 6

SUBMITTED	APPROVED	APPROVED
Date	M. L. BROOKS 10/12/67 Date	R. W. DRAKE 13 October 1967 Date

(Table 2, continued)

Experimental Code Number	Nominal Composition * Weight Percent	Reference HED	Weight Limit
X-0021	78.3 HMX/21.7 Halowax 1001	001	5 pounds
X-0022	82.8 HMX/17.2 Halowax 1001	001	5 pounds
X-0023	87.2 HMX/12.8 Halowax 1001	001	5 pounds
X-0024	91.5 HMX/8.5 Halowax 1001	001	5 pounds
X-0025	95.8 HMX/4.2 Halowax 1001	001	5 pounds
X-0026	77.3 HMX/22.7 Halowax 1013	001	5 pounds
X-0027	82.0 HMX/18.0 Halowax 1013	001	5 pounds
X-0028	86.6 HMX/13.4 Halowax 1013	001	5 pounds
X-0029	91.1 HMX/8.9 Halowax 1013	001	5 pounds
X-0030	95.6 HMX/4.4 Halowax 1013	001	5 pounds
X-0031	76.2 HMX/23.8 Halowax 1014	001	5 pounds
X-0032	81.0 HMX/19.0 Halowax 1014	001	5 pounds
X-0033	85.8 HMX/14.2 Halowax 1014	001	5 pounds
X-0034	90.6 HMX/9.4 Halowax 1014	001	5 pounds
X-0035	95.3 HMX/4.7 Halowax 1014	001	5 pounds
X-0036	74.0 HMX/26.0 Halowax 1051	001	5 pounds
X-0037	79.2 HMX/20.8 Halowax 1051	001	5 pounds
X-0038	84.3 HMX/15.7 Halowax 1051	001	5 pounds
X-0039	89.5 HMX/10.5 Halowax 1051	001	5 pounds
X-0040	94.8 HMX/5.2 Halowax 1051	001	5 pounds
X-0041	86.0 HMX/14.0 Epolene LV	001	5 pounds
X-0042	89.1 HMX/10.9 Epolene LV	001	5 pounds
X-0043	92.1 HMX/7.9 Epolene LV	001	5 pounds
X-0044	94.9 HMX/5.1 Epolene LV	001	5 pounds
X-0045	97.5 HMX/2.5 Epolene LV	001	5 pounds

* Item changed from Page Revision 2

SUBMITTED:	APPROVED:	APPROVED:
A. Popolato — 3/30/66 Date	M. L. BROOKS — 4/1/66 Date	R. W. DRAKE — 4/1/66 Date

(Table 2, continued)

Experimental Code Number	Nominal Composition * Weight Percent	Reference HED	Weight Limit
X-0046	85.9 HMX/14.1 Epolene HD	001	5 pounds
X-0047	89.0 HMX/11.0 Epolene HD	001	5 pounds
X-0048	92.0 HMX/8.0 Epolene HD	001	5 pounds
X-0049	94.8 HMX/5.2 Epolene HD	001	5 pounds
X-0050	97.5 HMX/2.5 Epolene HD	001	5 pounds
X-0051	77.6 HMX/22.4 Chlorowax 70	001	5 pounds
X-0052	82.2 HMX/17.8 Chlorowax 70	001	5 pounds
X-0053	86.7 HMX/13.3 Chlorowax 70	001	5 pounds
X-0054	91.2 HMX/8.8 Chlorowax 70	001	5 pounds
X-0055	95.6 HMX/4.4 Chlorowax 70	001	5 pounds
X-0056	73.0 HMX/27.0 Kel-F Wax 200	001	5 pounds
X-0057	78.3 HMX/21.7 Kel-F Wax 200	001	5 pounds
X-0058	83.6 HMX/16.4 Kel-F Wax 200	001	5 pounds
X-0059	89.0 HMX/11.0 Kel-F Wax 200	001	5 pounds
X-0060	94.5 HMX/5.5 Kel-F Wax 200	001	5 pounds
X-0061	75.5 HMX/24.5 Kel-F Elastomer L1107	001	5 pounds
X-0062	80.4 HMX/19.6 Kel-F Elastomer L1107	001	5 pounds
X-0063	85.3 HMX/14.7 Kel-F Elastomer L1107	001	5 pounds
X-0064	90.2 HMX/9.8 Kel-F Elastomer L1107	001	5 pounds
X-0065	95.1 HMX/4.9 Kel-F Elastomer L1107	001	5 pounds
X-0066	75.5 HMX/24.5 Kel-F Elastomer 3700	001	5 pounds
X-0067	80.4 HMX/19.6 Kel-F Elastomer 3700	001	5 pounds
X-0068	85.3 HMX/14.7 Kel-F Elastomer 3700	001	5 pounds
X-0069	90.2 HMX/9.8 Kel-F Elastomer 3700	001	5 pounds
X-0070	95.1 HMX/4.9 Kel-F Elastomer 3700	001	5 pounds

* Item changed from Page Revision 2

SUBMITTED:	APPROVED:	APPROVED:
A. Popolato — Date 3/30/66	M. L. BROOKS — Date 4/1/66	R. W. DRAKE — Date 4 Apr 1966

(Table 2, continued)

Experimental Code Number	Nominal Composition * Weight Percent	Reference HED	Weight Limit
X-0071	77.0 HMX/23.0 Exon 461	001	5 pounds
X-0072	81.7 HMX/18.3 Exon 461	001	5 pounds
X-0073	86.4 HMX/13.6 Exon 461	001	5 pounds
X-0074	91.0 HMX/9.0 Exon 461	001	5 pounds
X-0075	95.5 HMX/4.5 Exon 461	001	5 pounds
X-0076	85.6 RDX/14.4 Indowax 170/175	001	5 pounds
X-0077	88.7 RDX/11.3 Indowax 170/175	001	5 pounds
X-0078	91.7 RDX/8.3 Indowax 170/175	001	5 pounds
X-0079	94.6 RDX/5.4 Indowax 170/175	001	5 pounds
X-0080	97.4 RDX/2.6 Indowax 170/175	001	5 pounds
X-0081	81.9 RDX/18.1 Estane 5740X-2	001	5 pounds
X-0082	85.7 RDX/14.3 Estane 5740X-2	001	5 pounds
X-0083	89.5 RDX/10.5 Estane 5740X-2	001	5 pounds
X-0084	93.1 RDX/6.9 Estane 5740X-2	001	5 pounds
X-0085	96.6 RDX/3.4 Estane 5740X-2	001	5 pounds
X-0086	81.9 RDX/18.1 CPR-1-46A	001	5 pounds
X-0087	85.7 RDX/14.3 CPR-1-46A	001	5 pounds
X-0088	89.5 RDX/10.5 CPR-1-46A	001	5 pounds
X-0089	93.1 RDX/6.9 CPR-1-46A	001	5 pounds
X-0090	96.6 RDX/3.4 CPR-1-46A	001	5 pounds
X-0091	76.4 RDX/23.6 Halowax 1013	001	5 pounds
X-0092	81.2 RDX/18.8 Halowax 1013	001	5 pounds
X-0093	86.0 RDX/14.0 Halowax 1013	001	5 pounds
X-0094	90.7 RDX/9.3 Halowax 1013	001	5 pounds
X-0095	95.4 RDX/4.6 Halowax 1013	001	5 pounds

* Item changed from Page Revision 2

SUBMITTED:	APPROVED:	APPROVED:
Popolato 3/20/66 Date	M. L. BROOKS 4/6/66 Date	R. W. LRAKE 4/6/66 Date

(Table 2, continued)

Experimental Code Number	Nominal Composition * Weight Percent	Reference HED	Weight Limit
X-0096	85.4 RDX/14.6 Epolene LV	001	5 pounds
X-0097	88.6 RDX/11.4 Epolene LV	001	5 pounds
X-0098	91.7 RDX/8.3 Epolene LV	001	5 pounds
X-0099	94.6 RDX/5.4 Epolene LV	001	5 pounds
X-0100	97.4 RDX/2.6 Epolene LV	001	5 pounds
X-0101	74.5 RDX/25.5 Kel-F 3700	001	5 pounds
X-0102	79.6 RDX/20.4 Kel-F 3700	001	5 pounds
X-0103	84.7 RDX/15.3 Kel-F 3700	001	5 pounds
X-0104	89.8 RDX/10.2 Kel-F 3700	001	5 pounds
X-0105	94.9 RDX/5.1 Kel-F 3700	001	5 pounds
X-0106	76.1 RDX/23.9 Exon 461	001	5 pounds
X-0107	80.9 RDX/19.1 Exon 461	001	5 pounds
X-0108	85.7 RDX/14.3 Exon 461	001	5 pounds
X-0109	90.5 RDX/9.5 Exon 461	001	5 pounds
X-0110	95.3 RDX/4.7 Exon 461	001	5 pounds
X-0111	94.8 HMX/0.0 NQ/5.2 Estane 5740X-2	002	5 pounds
X-0112	85.9 HMX/8.9 NQ/5.2 Estane 5740X-2	002	5 pounds
X-0113	76.7 HMX/18.0 NQ/5.3 Estane 5740X-2	002	400 pounds
X-0114	67.6 HMX/27.1 NQ/5.3 Estane 5740X-2	002	5 pounds
X-0115	58.3 HMX/36.4 NQ/5.3 Estane 5740X-2	002	5 pounds
X-0116	48.9 HMX/45.8 NQ/5.3 Estane 5740X-2	002	5 pounds
X-0117	39.3 HMX/55.3 NQ/5.4 Estane 5740X-2	002	5 pounds
X-0118	29.7 HMX/64.9 NQ/5.4 Estane 5740X-2	002	400 pounds
X-0119	19.9 HMX/74.6 NQ/5.5 Estane 5740X-2	002	5 pounds
X-0120	10.0 HMX/84.5 NQ/5.5 Estane 5740X-2	002	5 pounds

* Item changed from Page Revision 2

SUBMITTED:	APPROVED:	APPROVED:
A. Popolato — Date 3/30/66	M. L. BROOKS — Date 4/1/66	R. W. DRAKE — Date 4/14/1966

*Table 2, continued)

Experimental Code Number	Nominal Composition * Weight Percent	Reference HED	Weight Limit
X-0121	92.9 HMX/0.0 NQ/7.1 Halowax 1013	002	5 pounds
X-0122	84.1 HMX/8.8 NQ/7.1 Halowax 1013	002	5 pounds
X-0123	75.2 HMX/17.6 NQ/7.2 Halowax 1013	002	5 pounds
X-0124	66.2 HMX/26.6 NQ/7.2 Halowax 1013	002	5 pounds
X-0125	57.1 HMX/35.6 NQ/7.3 Halowax 1013	002	5 pounds
X-0126	47.9 HMX/44.8 NQ/7.3 Halowax 1013	002	5 pounds
X-0127	38.5 HMX/54.1 NQ/7.4 Halowax 1013	002	5 pounds
X-0128	29.1 HMX/63.5 NQ/7.4 Halowax 1013	002	5 pounds
X-0129	19.5 HMX/73.1 NQ/7.4 Halowax 1013	002	5 pounds
X-0130	9.8 HMX/82.7 NQ/7.5 Halowax 1013	002	5 pounds
X-0131	92.8 HMX/0.0 NQ/7.2 Exon 461	002	5 pounds
X-0132	84.0 HMX/8.7 NQ/7.3 Exon 461	002	5 pounds
X-0133	75.1 HMX/17.6 NQ/7.3 Exon 461	002	5 pounds
X-0134	66.1 HMX/26.5 NQ/7.4 Exon 461	002	5 pounds
X-0135	57.0 HMX/35.6 NQ/7.4 Exon 461	002	5 pounds
X-0136	47.8 HMX/44.8 NQ/7.4 Exon 461	002	5 pounds
X-0137	38.5 HMX/54.0 NQ/7.5 Exon 461	002	5 pounds
X-0138	29.0 HMX/63.5 NQ/7.5 Exon 461	002	5 pounds
X-0139	19.5 HMX/72.9 NQ/7.6 Exon 461	002	5 pounds
X-0140	9.8 HMX/82.6 NQ/7.6 Exon 461	002	5 pounds
X-0142	90.2 HMX/4.6 DATB/5.2 Estane 5740X-2	004	5 pounds
X-0143	85.6 HMX/9.2 DATB/5.2 Estane 5740X-2	004	400 pounds
X-0144	76.3 HMX/18.5 DATB/5.2 Estane 5740X-2	004	400 pounds
X-0145	67.0 HMX/27.8 DATB/5.2 Estane 5740X-2	004	400 pounds

* Item changed from Page Revision 7

SUBMITTED:	APPROVED:	APPROVED:
J. Popolato 3/30/66	M. L. Brooks 4/1/66	R. W. Drake 4 Apr 1966
J. Popolato, Date	M. L. BROOKS, Date	R. W. DRAKE, Date

(Table 2, continued)

Experimental Code Number	Nominal Composition * Weight Percent	Reference HED	Weight Limit
X-0146	57.7 HMX/37.1 DATB/5.2 Estane 5740X-2	004	400 pounds
X-0147	48.2 HMX/46.5 DATB/5.3 Estane 5740X-2	004	400 pounds
X-0148	38.6 HMX/56.1 DATB/5.3 Estane 5740X-2	004	5 pounds
X-0149	29.1 HMX/65.6 DATB/5.3 Estane 5740X-2	004	5 pounds
X-0150	19.5 HMX/75.2 DATB/5.3 Estane 5740X-2	004	5 pounds
X-0151	9.7 HMX/84.9 DATB/5.4 Estane 5740X-2	004	5 pounds
X-0152	4.9 HMX/89.7 DATB/5.4 Estane 5740X-2	004	5 pounds
X-0154	88.4 HMX/4.5 DATB/7.1 Halowax 1013	004	5 pounds
X-0155	83.9 HMX/9.0 DATB/7.1 Halowax 1013	004	5 pounds
X-0156	74.8 HMX/18.1 DATB/7.1 Halowax 1013	004	5 pounds
X-0157	65.6 HMX/27.2 DATB/7.2 Halowax 1013	004	5 pounds
X-0158	56.4 HMX/36.4 DATB/7.2 Halowax 1013	004	5 pounds
-0159	47.2 HMX/45.6 DATB/7.2 Halowax 1013	004	5 pounds
0160	37.9 HMX/54.9 DATB/7.2 Halowax 1013	004	5 pounds
X-0161	28.5 HMX/64.2 DATB/7.3 Halowax 1013	004	5 pounds
X-0162	19.0 HMX/73.7 DATB/7.3 Halowax 1013	004	5 pounds
X-0163	9.6 HMX/83.1 DATB/7.3 Halowax 1013	004	5 pounds
X-0164	4.8 HMX/87.9 DATB/7.3 Halowax 1013	004	5 pounds
X-0165	92.2 HMX/0.0 DATB/7.8 KFE 3700	004	5 pounds
X-0166	87.7 HMX/4.5 DATB/7.8 KFE 3700	004	5 pounds
X-0167	83.3 HMX/8.9 DATB/7.8 KFE 3700	004	5 pounds
X-0168	74.2 HMX/17.9 DATB/7.9 KFE 3700	004	5 pounds
X-0169	65.1 HMX/27.0 DATB/7.9 KFE 3700	004	400 pounds
X-0170	56.0 HMX/36.1 DATB/7.9 KFE 3700	004	5 pounds

* Item changed from Page Revision 0

SUBMITTED	APPROVED	APPROVED
A. Popolato / Date	M. L. BROOKS / Date	R. W. DRAKE / Date

(Table 2, continued)

Experimental Code Number	Nominal Composition * Weight Percent	Reference HED	Weight Limit
X-0171	46.8 HMX/45.3 DATB/7.9 KFE 3700	004	5 pounds
X-0172	37.6 HMX/54.5 DATB/7.9 KFE 3700	004	5 pounds
X-0173	28.3 HMX/63.7 DATB/8.0 KFE 3700	004	400 pounds
X-0174	18.9 HMX/73.1 DATB/8.0 KFE 3700	004	5 pounds
X-0175	9.5 HMX/82.5 DATB/8.0 KFE 3700	004	5 pounds
X-0176	4.8 HMX/87.2 DATB/8.0 KFE 3700	004	5 pounds
X-0177	99.7 75/25 Cyclotol/0.3 α-nitronaphthalene	003	40 pounds
X-0178	99.6 75/25 Cyclotol/0.4 α-nitronaphthalene	003	40 pounds
X-0179	99.5 75/25 Cyclotol/0.5 α-nitronaphthalene	003	40 pounds
X-0180	92.2 HMX/0.0 NQ/7.8 KFE 3700	002	5 pounds
X-0181	83.5 HMX/8.7 NQ/7.8 KFE 3700	002	5 pounds
X-0182	74.6 HMX/17.5 NQ/7.9 KFE 3700	002	5 pounds
X-0183	65.7 HMX/26.4 NQ/7.9 KFE 3700	002	400 pounds
X-0184	56.6 HMX/35.4 NQ/8.0 KFE 3700	002	5 pounds
X-0185	47.5 HMX/44.5 NQ/8.0 KFE 3700	002	5 pounds
X-0186	38.2 HMX/53.7 NQ/8.1 KFE 3700	002	5 pounds
X-0187	28.8 HMX/63.1 NQ/8.1 KFE 3700	002	5 pounds
X-0188	19.3 HMX/72.5 NQ/8.2 KFE 3700	002	5 pounds
X-0189	9.7 HMX/82.1 NQ/8.2 KFE 3700	002	5 pounds
X-0190	89.11 RDX/9.9 KFE 3700/0.99 Beeswax w/Alox	006	300 pounds
X-0191	93.07 HMX/2.97 NC/2.9 CEF/0.99 Beeswax w/Alox	006	500 pounds
X-0192	85.0 HMX/15.0 Viton	007	1000 pounds

* Item changed from Page Revision 1

SUBMITTED:	APPROVED:	APPROVED:
Popolato 3/30/66 Date	M. L. BROOKS 4/1/66 Date	R. W. DRAKE Date

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent	Reference HED	Weight Limit
X-0193	Experimental detonating fuse explosives Compositions range from 73.1 HMX/26.9 Sylgard 182 to 98.9 HMX/1.1 Sylgard 182	008	See footnote
X-0194	Experimental detonating fuse explosives Compositions range from 70 PETN/30 Sylgard 182 to 80 PETN/20 Sylgard 182	008 Phase 3, Addendum 2	20 pounds
* X-0195	55.9 HMX/36.1 DATB/8.0 Estane	004	400 pounds
* X-0196	56.8 HMX/36.6 DATB/6.6 Estane	004	400 pounds
X-0197	88.7 HMX/11.3 Teflon	001	5 pounds
X-0198	67.1 HMX/32.9 Teflon	001	5 pounds
X-0199	88.7 HMX/10.3 Teflon w/wax and Alox	001	5 pounds
X-0200	67.4 HMX/32.6 Teflon w/wax and Alox	001	5 pounds
X-0201	60 TNT/40 RDX	009	200 pounds
X-0202	40 Barium Nitrate/60 TNT	005	800 pounds
X-0204	83.2 HMX/16.8 Teflon	001, Addendum 8	1000 pounds
X-0205	84.2 HMX/15.8 Teflon w/wax and Alox	001, Addendum 8	1000 pounds
X-0206	84.2 HMX/15.8 Nitroso elastomer	011	150 pounds
X-0207	80 HMX/20 Sylgard 182	008	500 pounds
X-0208	80 RDX/20 Sylgard 182	008	500 pounds
X-0209	95.5 HMX/2.5 Elvax 460/2.5 Be-Square 170/175 wax	012	1000 pounds

Footnote: Weight limit for any given composition is 500 grams. Within this limit, material may be replaced as cross-linked batches and are sent for disposal.

* Item changed from Page Revision 3

SUBMITTED:	SUBMITTED:	SUBMITTED:
L. Flaugh 10-12-71	A. Popolato 10/12/71	DATE
APPROVED:	APPROVED:	APPROVED:
C. R. West 10-19-71	R. W. Drake 21 October 1971	R. Reider 21 Oct 71
C. R. WEST DATE	R. W. DRAKE DATE	R. REIDER DATE

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0210	94.1 HMX/2.95 Estane/2.95 BDNPF		013	1000 pounds
X-0211	LX-07 - 90 HMX/10 Viton A		014	500 pounds
X-0212	90 HMX/10 CPR X9B-78B		015	1000 pounds
X-0213	94.6 HMX/2.0 Estane/2.0 BDNPF/1.4 Be-Square 170/175 wax		016	1000 pounds
X-0214	90 HMX/10 Viton A		017	1000 pounds
X-0215	90.0 HMX/8.5 Viton A/1.5 Beeswax		017	1000 pounds
X-0217	HMX	25 - 94	019	See HED-019, V.C.
	DNPA	0 - 50		
	BDNPF	0 - 50		
	BDNPA	0 - 50		
	Wax	0 - 5		
	Surface Active Agents	0 - 0.25		
X-0218	HMX	90 - 95	020	1000 pounds
	Halowax 1014	0 - 10		
	Hydrocarbon Waxes	0 - 5		
	Alox	0 - 2		
	Estane	0 - 2		
	Surface Active Agents	0 - 1		
X-0219	TATB	0 - 92	021	See HED-021, III.C.
	HMX	0 - 92		
	Kel-F	9 - 15		
X-0220	DATB	40 - 60	022	*See HED-022, V.D.
	Urea-formaldehyde Microballoons	20 - 40		
	Epoxy resin/chlorendic anhydride	10 - 30		
X-0221	RDX	40 - 60	022	*See HED-022, V.D.
	Urea-formaldehyde Microballoons	20 - 40		
	Epoxy resin/chlorendic anhydride	10 - 30		

* Item changed from Page Revision 0

SUBMITTED:	APPROVED:	APPROVED:
A. Popolato — Date	M. L. BROOKS — Date	R. W. DRAKE — Date

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0222	DATB	30 - 60	022	See HED-022, V.D.
	Phenol-formaldehyde Microballoons	20 - 50		
	Epoxy resin/chlorendic anhydride	10 - 30		
X-0223	RDX	30 - 60	022	See HED-022, V.D.
	Phenol-formaldehyde Microballoons	20 - 50		
	Epoxy resin/chlorendic anhydride	10 - 30		
X-0224	RDX	74.0	023	4000 pounds - uncoated
	Aluminum	20.0		*2000 pounds - coated
	Be-Square 170/175 wax	5.4		
	Elvax 460	0.6		
	*Coating compounds	0 - 0.5		
X-0225	HMX	94.0	024	1000 pounds
	DNPA	3.5		
	FEFO	2.5		
X-0226	RDX	80 - 90	001	See HED-001, Addendum 9, VI.C.
	Estane	20 - 10		
EDC-8	PETN	76.0	025	See HED-025, IV.E.
	RTV Silicone	24.0		
X-0227	Nitroguanidine	70 - 100	026	1000 pounds
	Kel-F elastomer	0 - 30		
X-0228	Nitroguanidine	70 - 100	026	1000 pounds
	Estane 5703	0 - 30		
X-0229	Nitroguanidine	70 - 100	026	1000 pounds
	DNPA polymer	0 - 18		
	BDNPF/A nitroplasticizer	0 - 12		

* Item added to Page Revision 5

SUBMITTED:	APPROVED:	APPROVED:
A. Popolato — Date 6/18/70	M. L. BROOKS — Date 6/19/70	R. W. DRAKE — Date 29 June 1970

ble 2, continued)

perimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0230	RDX Be-Square 170/175 wax - Elvax 460	94 6	023	See HED-023 Addendum 1, V.C.
X-0231	HMX Tungsten Exon 461 Plasticizer	5 - 40 40 - 95 0 - 10 0 - 5	027	See HED-027 VI. D.
X-0232	HMX Tungsten Kel-F Plasticizer	5 - 40 40 - 95 0 - 10 0 - 5	027	See HED-027 VI. D.
X-0233	HMX Tungsten Polystyrene Plasticizer	5 - 40 40 - 95 0 - 10 0 - 5	027	See HED-027 VI. D.
X-0234	HMX DNPA CEF Surface-active agents	90 - 95 0 - 10 0 - 5 0 - 0.5	019	See HED-019 VI. D.
X-0235	HMX DNPA BDNPF-BDNPA eutectic Estane Surface-active agents	90 - 95 0 - 10 0 - 10 0 - 5 0 - 0.5	019	See HED-019 VI. D.
*X-0236	TATB Polystyrene/DOP Surface-active agents	≤ 95 ≥ 5 ≤ 1	028	See HED-028 V. D.
*X-0237	TATB Wax/Elvax Surface-active agents	≤ 95 ≥ 5 ≤ 1	028	See HED-028 V. D.

* Item added to Page Revision 2

SUBMITTED:	APPROVED:	APPROVED:
A. Popolato — 1/2/69 Date	M. L. BROOKS — 1/3/69 Date	R. W. DRAKE — 9 January 1969 Date

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0238	TATB	≤ 95	028	See HED-028 V.D.
	Estane	≥ 5		
	Surface Active Agents	≥ 1		
X-0239	HMX	5 - 40	027	See HED-027 VI.D.
	Tungsten	40 - 95		
	Estane	0 - 10		
	Plasticizer	0 - 5		
X-0240 (LX-10)	HMX	95	029	See HED-029 IV.
	Viton	5		
X-0241	Nitroguanidine	90 - 100	026	1000 pounds
	Wax/Elvax	0 - 10	Addendum 1	
*X-0242	HMX	90 - 95	013	5000 pounds
	BDNPF-A	0 - 5	Addendum 2	
	Estane	0 - 5		
	Calcium Stearate	0 - 0.5		
X-0243	DATB	≤ 95	028	500 pounds
	Polystyrene/DOP	≥ 5	Addendum 1	
X-0244	DATB	≤ 95	028	500 pounds
	Polystyrene/TOF	≥ 5	Addendum 1	
X-0245	DATB	≤ 95	028	500 pounds
	Wax/Elvax	≥ 5	Addendum 1	
X-0246	DATB	≤ 95	028	500 pounds
	Estane	≥ 5	Addendum 1	
X-0247	DATB	≤ 95	028	500 pounds
	Kel-F	≥ 5	Addendum 1	

* Item changed from Page Revision 5

SUBMITTED: D. Salgado 3/9/72 Salgado DATE	SUBMITTED: A. Popolato 3/7/72 A. Popolato DATE	SUBMITTED: DATE
ED: West 3/13/72 . WEST DATE	APPROVED: R. W. Drake 17 Mar 1972 R. W. DRAKE DATE	APPROVED: R. Reider 17 Mar 1972 R. REIDER DATE

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0248	DATB DNPA/BDNPA-F	≤ 95 ≥ 5	028 Addendum 1	500 pounds
X-0249	RDX Sylgard 182 Barium carbonate	≤ 42.9 (50 v/o) 0-40 0-70	008 Addendum 1	5 pounds
X-0250	RDX Sylgard 182 Cyanuric acid	≤ 57.5 (50 v/o) 0-40 0-70	008 Addendum 1	5 pounds
X-0251	DATB Sylgard 182 Barium carbonate	≤ 42.6 (50 v/o) 0-40 0-70	008 Addendum 1	5 pounds
X-0252	DATB Sylgard 182 Cyanuric acid	≤ 57.1 (50 v/o) 0-40 0-70	008 Addendum 1	5 pounds
X-0253	TATB Dapon M	< 95 < 5	028 Addendum 2	500 pounds
* X-0254	RDX Estane $BaCO_3$	≤ 47.3 ≥ 6.3	HED-030	5 pounds
* X-0255	RDX Estane Oxamide	≤ 66.5 ≥ 8.9 ≥ 24.6	HED-030	5 pounds
* X-0256	RDX Viton $BaCO_3$	≤ 45.7 ≥ 9.4 ≥ 44.9	HED-030	5 pounds

* Item added to Page Revision 1

UBMITTED: H. L. Flaugh 10-29-71 DATE . Flaugh	SUBMITTED: P. G. Salgado 10/29/71 DATE P. G. Salgado	SUBMITTED: A. Popolato 11/15/71 DATE A. Popolato
ROVED: West 11-18-71 DATE C. R. WEST	APPROVED: R. W. Drake 6 December 1971 DATE R. W. DRAKE	APPROVED: R. Reider 12-6-71 DATE R. REIDER

Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0257	RDX	≤ 63.5	HED-030	5 pounds
	Viton	≥ 13.0		
	Oxamide	≥ 23.5		
X-0258	RDX	≤ 47.7	HED-030	5 pounds
	Polystyrene	≥ 4.1		
	DOP	≥ 1.4		
	$BaCO_3$	≥ 46.8		
X-0259	RDX	≤ 67.4	HED-030	5 pounds
	Polystyrene	≥ 5.8		
	DOP	≥ 1.9		
	Oxamide	≥ 24.9		
X-0260	RDX	≤ 47.9	HED-030	5 pounds
	Wax	≥ 2.5		
	Elvax	≥ 2.5		
	$BaCO_3$	≥ 47.1		
X-0261	RDX	≤ 67.9	HED-030	5 pounds
	Wax	≥ 3.6		
	Elvax	≥ 3.5		
	Oxamide	≥ 25.0		
X-0262	DATB	≤ 47.0	HED-030	5 pounds
	Estane	≥ 6.3		
	$BaCO_3$	≥ 46.7		
X-0263	DATB	≤ 66.3	HED-030	5 pounds
	Estane	≥ 8.9		
	Oxamide	≥ 24.8		
X-0264	DATB	≤ 45.4	HED-030	5 pounds
	Viton	≥ 9.4		
	$BaCO_3$	≥ 45.2		

SUBMITTED: Podpolato — DATE	SUBMITTED: P. G. Salgado — DATE 10/28/71	SUBMITTED: H. L. Flaugh — DATE 10-29-71
ED: R. WEST — DATE 11-18-71	APPROVED: R. W. DRAKE — DATE 6 December 1971	APPROVED: R. REIDER — DATE 12-6-71

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0265	DATB	≤63.2	HED-030	5 pounds
	Viton	≥13.1		
	Oxamide	≥23.7		
X-0266	DATB	≤47.4	HED-030	5 pounds
	Polystyrene	≥ 4.1		
	DOP	≥ 1.4		
	$BaCO_3$	≥47.1		
X-0267	DATB	≤67.1	HED-030	5 pounds
	Polystyrene	≥ 5.8		
	DOP	≥ 2.0		
	Oxamide	≥25.1		
X-0268	DATB	≤47.6	HED-030	5 pounds
	Wax	≥ 2.5		
	Elvax	≥ 2.5		
	$BaCO_3$	≥27.4		
X-0269	DATB	≤67.6	HED-030	5 pounds
	Wax	≥ 3.6		
	Elvax	≥ 3.5		
	Oxamide	≥25.3		
X-0270	RDX	50-85	HED-022 Addendum 3	200 pounds
	Exon	15-50		
* X-0271	Barium Nitrate	~76.0	HED-031	2000 pounds
	TNT	~24.0		
	Decylgallophenone or Nitrocellulose	~ 0.5		

* Item added to Page Revision 1

SUBMITTED: [signature] 3/28/72 DATE — Popolato	SUBMITTED: [signature] 3/28/72 DATE — P. G. Salgado	SUBMITTED: DATE
APPROVED: [signature] 4/3/72 DATE — R. WEST	APPROVED: [signature] 12 April 72 DATE — R. W. DRAKE	APPROVED: [signature] 13 April 72 DATE — R. REIDER

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0272	HMX	≤95	HED-013 Addendum 3	500 pounds
	TATB	0 - 10		
	Estane	0 - 5		
	Calcium Stearate	0 - 0.5		
X-0273	HMX	≤92	HED-021 Addendum 1	500 pounds
	DATB	≤92		
	Kel-F	8 - 15		
X-0274	RDX	0 - 60	HED-032 Addendum 1	1000 pounds
	TNT	35 - 100		
	AN (NH_4NO_3)	0 - 70		
	Compatible surface active agent	0 - 2		
*X-0275	TATB	40	HED-033	50 kg
	TNT	40		
	Aluminum	20		
*X-0276	RDX	59.5	HED-023 Addendum 3	50 kg
	Cu	35.9		
	B^3 wax	4.1		
	Elvax	0.5		
*X-0277	RDX	62.2	HED-023 Addendum 3	50 kg
	Fe	33.0		
	B^3 wax	4.3		
	Elvax 460	0.5		
*X-0278	RDX	42.2	HED-023 Addendum 3	50 kg
	$Ba(NO_3)_2$	52.9		
	B^3 wax	4.4		
	Elvax	0.5		
*X-0279	RDX	54.1	HED-023 Addendum 3	50 kg
	$CsNO_3$	40.8		
	B^3 wax	4.6		
	Elvax	0.5		

*Items changed from Page Revision 3

SUBMITTED: A. Popolato 4/5/74 DATE	SUBMITTED: H. L. Flaugh 4-5-74 DATE	SUBMITTED: DATE
APPROVED: C. R. WEST 4/8/74 DATE	APPROVED: W. W. DRAKE 12 April 1974 DATE	APPROVED: R. REIDER 12 April 74 DATE

(Table 2, continued)

Experimental Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0280	RDX Estane	95.0 5.0	HED-013 Addendum 5	250 kg
X-0281	RDX Estane BDNPA/F	95.0 2.5 2.5	HED-013 Addendum 5	250 kg
X-0282	HMX Estane	95.5 4.5	HED-034 Phase 3	500 kg
X-0283	HMX Viton Kel-F elastomer Various plasticizers	≤95.0 2.5 to 10.0 2.5 to 10.0 2.5 to 5.0	HED-029 Phase 3 Addendum 1	500 kg
X-0284	RDX TNT AN (KNO_3) Compatible surface active agents	0 to 60 35 to 100 0 to 70 0 to 2	HED-032 Phase 3 Addendum 2	500 kg
X-0285	HMX Vibrathane	95.5 4.5	HED-034 Phase 3 Addendum 1	500 kg
X-0286	HMX Kraton High-vacuum oil plasticizer	97 ± 0.5 1.35 1.65	HED-035 Phase 3	250 kg
X-0287	HMX Kraton B[9] Wax	97.4 ± 0.5 1.43 1.17	HED-035 Phase 3 Addendum 1	250 kg
*X-0288	HMX Fluorolube MO-10 Cab-O-Sil	≤75.0 ≥22.0 ≤3.0	HED-008 Phase 2 Addendum 2	5 kg

*Item added to Page Revision 5

SUBMITTED: 1-3-75 DATE Pobolato	SUBMITTED: 1-3-75 DATE H. L. Flaugh	SUBMITTED: DATE
APPROVED: 1-8-75 DATE C. R. WEST	APPROVED: 20 January 1975 DATE R. W. DRAKE	APPROVED: 20 Jan 75 DATE R. REIDER

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0289	HMX Fluorolube LG-260 Cab-O-Sil	≤ 75.0 ≥ 22.0 ≤ 3.0	HED-008 Phase 2 Addendum 2	5 kg
*X-0290	TATB Kel-F 800	95 5	HED-021 Phase 3 Addendum 7	2000 kg
X-0291	TATB Kel-F 800	92.5 7.5	HED-021 Phase 3 Addendum 5	500 kg
X-0292	TATB Vibrathanes	92 → 98 2 → 8	HED-021 Phase 3 Addendum 5	500 kg
X-0293	RDX AN	40 ± 2 60 ± 2	HED-036 Phase 3	45.4 kg
X-0294	RDX AN MAN	40 ± 2 45 ± 2 15 ± 2	HED-036 Phase 3	45.4 kg
X-0295	RDX AN MAN	40 ± 2 30 ± 2 30 ± 2	HED-036 Phase 3	45.4 kg
X-0296	TATB Kraton	90 → 99 10 → 1	HED-021 Phase 3 Addendum 5	500 kg
X-0297	TATB Kel-F 800	97.5 2.5	HED-021 Phase 3 Addendum 5	500 kg
X-0298	HMX Kraton Hyvac oil 930503	97.5 1.12 1.38	HED-035 Phase 3 Addendum 2	250 kg

*Item changed from Page Revision 5

SUBMITTED: H. J. Flaugh 8-12-76 DATE	SUBMITTED: A. Popolato 8/12/76 DATE	SUBMITTED: DATE
APPROVED: H. B. FLETCHER 8-16-76 DATE	APPROVED: R. W. DRAKE 23 Aug 1976 DATE	APPROVED: R. REIDER 24 Aug DATE

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0299	DATB Viton A	95 ± 2 5 ± 2	HED-004 Phase 3 Addendum 5	25 kg
X-0300	DATB Estane	95 ± 2 5 ± 2	HED-004 Phase 3 Addendum 5	25 kg
X-0301	RDX Viton A	95 5	HED-029 Phase 3 Addendum 2	100 kg
X-0302	FKM		HED-040 Phase 2	5 kg
*X-0303	RDX Estane Polyester fibers	95.0 4.5 0.5	HED-013 Phase 3 Addendum 7, Rev 1	2000 kg
*X-0304	RDX Estane Polyester fibers	95.0 3.5 1.5	HED-013 Phase 3 Addendum 7, Rev. 1	2000 kg
X-0305	TATB Kel-F 800 Fluorolube plasticizer	95.0 2.5 2.5	HED-021 Phase 3 Addendum 5	2000 kg
X-0306	Nitroguanidine Viton A	95.0 5.0	HED-026 Phase 3 Addendum 3	500 kg
X-0307	Nitroguanidine Viton A Fluorolube plasticizer	95.0 4.0 1.0	HED-026 Phase 3 Addendum 3	500 kg
**X-0308	RDX Estane Polyethylene fibers	95.0 4.5 0.5	HED-013 Phase 3 Addendum 7, Rev. 1	2000 kg

*Item changed from Page Revision 5
**Item added to Page Revision 5

ED: [signature] 10-12-76 DATE	SUBMITTED: [signature] 10/12/76 A. Pocolato DATE	SUBMITTED:
D: [signature] 10-14-76 FLETCHER DATE	APPROVED: [signature] 11/3/76 for R. W. DRAKE DATE	APPROVED: [signature] R. REIDER

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0309 (Destex)	TNT Aluminum D-2 Acetylene black (carbon)	74.6 18.7 4.8 1.9	HED-041 Phase 3	500 kg
X-0310	NQ Viton LM	95.0 5.0	HED-026 Phase 3 Addendum 4	100 kg
X-0311	NQ Viton 10	95.0 5.0	HED-026 Phase 3 Addendum 4	100 kg
X-0312	RDX Estane Polyethylene fibers	95.0 3.5 1.5	HED-013 Phase 3 Addendum 7 Revision 1	100 kg
X-0313	NQ Viton A-HV	95.0 5.0	HED-026 Phase 3 Addendum 4	100 kg
X-0314	NQ Viton C-10	95.0 5.0	HED-026 Phase 3 Addendum 4	100 kg
X-0315	NQ Viton L-31	95.0 5.0	HED-026 Phase 3 Addendum 4	100 kg
X-0316	NQ RDX Viton A	91.0 4.0 5.0	HED-026 Phase 3 Addendum 5	1 kg
X-0317	NQ RDX Viton A	87.0 8.0 5.0	HED-026 Phase 3 Addendum 5	1 kg
*X-0318	HNS Sylgard 182	80.0 20.0	HED-038 Phase 2	0.1 kg

*Item added to Page Revision 4

SUBMITTED: A. Popolato 1/3/78 DATE	SUBMITTED: H. L. Flaugh 1-3-78 DATE	SUBMITTED: DATE
APPROVED: 1/6/78	APPROVED: 13 January 1978 DATE	APPROVED: 1/16/78 DATE

Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0319	TATB	50.0	HED-021	100 kg
	HMX	45.0	Phase 3	
	Kel-F 800	5.0	Addendum 10	
X-0320	TATB	60.0	HED-021	100 kg
	HMX	35.0	Phase 3	
	Kel-F 800	5.0	Addendum 10	
X-0321	TATB	75.0	HED-021	100 kg
	HMX	20.0	Phase 3	
	Kel-F 800	5.0	Addendum 10	
X-0322	Fairy Dust 2/1		HED-042	1 kg
			Phase 2	
*X-0323	NQ	95.0	HED-026	100 kg
	Kraton G/Hyvac oil	5.0	Phase 3	
			Addendum 6	
X-0324	NQ	50.0	HED-026	100 kg
	HMX	45.0	Phase 3	
	Viton A	5.0	Addendum 6	
*X-0325	NQ	60.0	HED-026	100 kg
	HMX	35.0	Phase 3	
	Viton A	5.0	Addendum 6	
*X-0326	NQ	75.0	HED-026	100 kg
	HMX	20.0	Phase 3	
	Viton A	5.0	Addendum 6	
*X-0327	NQ	50.0	HED-026	100 kg
	HMX	45.0	Phase 3	
	Kraton G/Hyvac oil	5.0	Addendum 6	
*X-0328	NQ	60.0	HED-026	100 kg
	HMX	35.0	Phase 3	
	Kraton G/Hyvac oil	5.0	Addendum 6	
X-0329	TATB	96.9	HED-021	227 kg
	Phenoxy	3.1	Phase 3	
			Addendum 5	

*Item added to Page Revision 2

ED: A. P. Torres, DATE 8-15-78	SUBMITTED: A. Popolato, DATE 8/16/78	SUBMITTED: DATE
OVED: R. J. Daly, DATE 8/23/78	APPROVED: for R. W. Drake, DATE 8/30/78	APPROVED: L. A. Blackwell, DATE 9/11/78

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0330	TATB Polystyrene/polyphenylene-oxide	97.2 2.8	HED-021 Phase 3 Addendum 5	227 kg
X-0331	TATB Kel-F 800	99.5 0.5	HED-021 Phase 3 Addendum 5	227 kg
X-0332	TATB Kel-F 800	99.0 1.0	HED-021 Phase 3 Addendum 5	227 kg
X-0333	TATB Kel-F 800	98.0 2.0	HED-021 Phase 3 Addendum 5	227 kg
X-0334	NQ HMX Kraton G/Hyvac oil	75.0 20.0 5.0	HED-026 Phase 3 Addendum 6	100 kg
X-0335	NQ HMX Kraton G/Hyvac oil	45.0 45.0 10.0	HED-026 Phase 3 Addendum 6	100 kg
X-0336	NQ Polyvinyl alcohol	95.0 5.0	HED-026 Phase 3 Addendum 6	100 kg
X-0337	NQ Kel-F 800	95.0 5.0	HED-026 Phase 3 Addendum 6	100 kg
X-0338	NQ Viton A	99.5 0.5	HED-026 Phase 3 Addendum 6	100 kg
*X-0339	TATB Kel-F 800 Polyethylene fibers	95.0 4.5 0.5	HED-021 Phase 3 Addendum 5	90.8 kg

*Item added to Page Revision 1

PREPARED: J. Torres 11/13/78 DATE	SUBMITTED: A. Popolato 11/13/78 A. Popolato DATE	SUBMITTED: DATE
REVIEWED: R. J. Daly 11/13/78 R. J. DALY DATE	APPROVED: R. W. DRAKE DATE	APPROVED: L. A. BLACKWELL DATE

(Table 2, continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0340	NO Nylon	95.0 5.0	HED-026 Phase 3 Addendum 4	3 kg
X-0341	TATB HMX Kel-F 800	90.25 4.75 5.0	HED-021 Phase 3 Addendum 10	100 kg
X-0342	TATB HMX Kel-F 800	85.5 9.5 5.0	HED-021 Phase 3 Addendum 10	100 kg
X-0343	TATB HMX Kel-F 800	80.75 14.25 5.0	HED-021 Phase 3 Addendum 10	100 kg
X-0344	TATB HMX Kel-F 800	71.25 23.75 5.0	HED-021 Phase 3 Addendum 10	90.8 kg
X-0345	TATB Kraton 6 Hyvac oil	97.6 1.68 0.72	HED-021 Phase 3 Addendum 5	90.8 kg
X-0346	Nitromethane	100.0	HED-043 Phase 2	5.0 lb
X-0347	Nitromethane Aluminum powder	80.0 20.0	HED-043 Phase 2	5.0 lb
X-0348	Nitromethane Aluminum powder Polymethyl methacrylate	75.0 20.0 5.0	HED-043 Phase 2	5.0 lb
*X-0349	TATB, Superfine HMX Kel-F 800	90.0 5.0 5.0	HED-021 Phase 3 Addendum 10	90.8 kg
*X-0350	TATB, Superfine HMX Kel-F 800	85.0 10.0 5.0	HED-021 Phase 3 Addendum 10	90.8 kg

*Item added to Page Revision 3

FIED: Torres 4/20/79 DATE	SUBMITTED: H. L. Flauch 5-9-79 DATE	SUBMITTED: DATE
ROVED: R. J. DALY 5/21/79 DATE	APPROVED: R. W. DRAKE DATE	APPROVED: L. A. BLACKWELL DATE

Table 2 (continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0351	TATB, Superfine	80.0	HED-021	90.8 kg
	HMX	15.0	Phase 3	
	Kel-F 800	5.0	Addendum 10	
X-0352	TATB, Superfine	75.0	HED-021	90.8 kg
	HMX	20.0	Phase 3	
	Kel-F 800	5.0	Addendum 10	
X-0353	TATB, Superfine	92.5	HED-021	100 kg
	HMX	5.0	Phase 3	
	Kel-F 800	2.5	Addendum 11	
X-0354	TATB, Superfine	87.5	HED-021	100 kg
	HMX	10.0	Phase 3	
	Kel-F 800	2.5	Addendum 11	
X-0355	TATB, Superfine	82.5	HED-021	100 kg
	HMX	15.0	Phase 3	
	Kel-F 800	2.5	Addendum 11	
X-0356	TATB, Superfine	77.5	HED-021	100 kg
	HMX	20.0	Phase 3	
	Kel-F 800	2.5	Addendum 11	
X-0357	TATB, Superfine	82.5	HED-021	90.8 kg
	HMX	12.5	Phase 3	
	Kel-F 800	5.0	Addendum 10	
X-0358	TATB, Superfine	85.0	HED-021	100 kg
	HMX	12.5	Phase 3	
	Kel-F 800	2.5	Addendum 11	
X-0359	TNT	25-75	HED-044	100 kg
	NQ	25-75	Phase 3	
*X-0360	RDX	82.0	HED-046	3 kg
	Polyurethane binder	18.0	Phase 2	
*X-0361	RDX	67.0	HED-046	3 kg
	Aluminum	18.0	Phase 2	
	Polyurethane binder	15.0		

*Item added to Page Revision 2

TED: H. L. Flaugh DATE 4-14-80	SUBMITTED: DATE	SUBMITTED: DATE
ROVED: DATE 4/14/80	APPROVED: W. W. DRAKE DATE	APPROVED: L. A. BLACKWELL DATE 5/8/80

Table 2 (continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0362	AN-FO	90.0	HED-047	50 g
	Aluminum	10.0	Phase 3	
X-0363	AN-FO	80.0	HED-047	50 g
	Aluminum	20.0	Phase 3	
X-0364	AN	40.4	HED-042	1 kg
	ADNT	52.4	Phase 2	
	KN	7.2	Addendum 2	
X-0365	AN	42.0	HED-042	1 kg
	ADNT	11.0	Phase 2	
	EDD	39.0	Addendum 2	
	KN	8.0		
X-0366	AN	50.0	HED-042	1 kg
	EDD	50.0	Phase 2	
			Addendum 2	
X-0367	AN	44.1	HED-042	1 kg
	EDD	48.1	Phase 2	
	KN	7.8	Addendum 2	
*X-0368	EDD	50.0	HED-048	25 kg
	AN	42.5	Phase 3	
	KN	7.5		
*X-0369	RDX	14.2	HED-048	25 kg
	EDD	40.3	Phase 3	
	AN	40.3		
	Aluminum	5.2		
*X-0370	RDX	12.8	HED-048	25 kg
	EDD	36.2	Phase 3	
	AN	36.2		
	Aluminum	14.8		

*Item added to Page Revision 0

TEST: H. I. Flaugh 9-11-80 DATE	SUBMITTED: DATE	SUBMITTED: DATE
APPROVED: R. J. Daly 9/12/80 DATE	APPROVED: R. W. Drake 10/6/80 DATE	APPROVED: L. A. Blackwell 10/14/80 DATE

Table 2 (continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0371	TATB	51.00	HED-021	100 kg
	HMX	46.00	Phase 3	
	Estane	3.00	Addendum 13	
X-0372	TATB	51.40	HED-021	100 kg
	HMX	46.30	Phase 3	
	Kraton Oil	2.30	Addendum 13	
X-0373	TATB	43.00	HED-021	100 kg
	HMX	55.00	Phase 3	
	Estane	2.00	Addendum 13	
X-0374	TATB	43.00	HED-021	100 kg
	HMX	55.00	Phase 3	
	Kraton Oil	2.00	Addendum 13	
X-0375	RDX	45.00	HED-049	100 kg
	TNT	30.00	Phase 3	
	Al	20.00		
	D-2 Wax	5.00		
X-0376	TATB	27.51	HED-021	3 kg
	Oil	72.49	Phase 3	
			Addendum 12	
X-0377	TATB	46.06	HED-021	3 kg
	Oil	53.94	Phase 3	
			Addendum 12	
X-0378	TATB	77.35	HED-021	3 kg
	Oil	22.65	Phase 3	
			Addendum 12	
X-0379	TATB	80.00	HED-021	3 kg
	Oil	20.00	Phase 3	
			Addendum 12	
X-0380	TATB	85.00	HED-021	3 kg
	Oil	15.00	Phase 3	
			Addendum 12	

[illegible]TED: [illegible] L. Flaugh 11-24-80 DATE	SUBMITTED: DATE	SUBMITTED: DATE
[illegible]ED: R. J. Daly 11/19/80 DATE	APPROVED: R. W. Drake DATE	APPROVED: L. A. Blackwell 12/8/80 DATE

Table 2 (continued)

Experimental Code Number	Nominal Composition Weight Percent		Reference HED	Weight Limit
X-0381	BTX*	80.00	HED-038 Phase 2	3 kg
	Sylgard	20.00		
	*5,7-dinitro-1-picryl-benzotriazole			
X-0382	NQ	50.00	HED-048 Phase 3 Addendum 1	500 kg
	EDD	25.00		
	AN	21.25		
	KN	3.75		
X-0383	BTF	80.00	HED-038 Phase 2 Addendum 1	500 g
	Sylgard	20.00		
X-0384	DATB	80.00	HED-038 Phase 2 Addendum 1	500 g
	Sylgard	20.00		
X-0385	PYX	80.00	HED-038 Phase 2 Addendum 1	500 g
	Sylgard	20.00		
* X-0386	EDD	42.50	HED-048 Phase 3 Addendum 2	227 kg
	AN	36.10		
	KN	6.40		
	Al	15.00		
* X-0387	EDD	49.00	HED-048 Phase 3 Addendum 2	227 kg
	AN	41.60		
	KN	7.40		
	RDX	2.00		
* X-0388	EDD	32.50	HED-048 Phase 3 Addendum 2	227 kg
	AN	27.60		
	KN	4.90		
	NQ	25.00		
	Al	10.00		
* X-0389	TATB	13.46	HED-027 Phase 3 Addendum 3	100 kg
	Tungsten	85.24		
	Polystyrene	0.80		
	DOP	0.50		

*Items added to Page Revision 0

APPROVED: H. L. Flaugh 8-20-81 DATE	SUBMITTED: DATE	SUBMITTED: DAT
APPROVED: R. J. Daly 8/25/81 DATE	APPROVED: R. W. Drake 7 Oct 1981 DATE	APPROVED: L. A. Blackwell 10/9 DAT

Table 2 (Continued)

Experimental Code Number	Nominal Composition Weight Per Cent		Reference HED	Weight Limit
X-0390	TATB	6.74	HED-027 Phase 3 Addendum 3	100 kg
	HMX	6.60		
	Tungsten	85.36		
	Polystyrene	0.80		
	DOP	0.50		
X-0391	TNT	80.00	HED-050 Phase 3	91 kg
	LiF	20.00		
X-0392	TPM	80.0 vol%	HED-045 Phase 2	3 kg
	RTV-619	20.0 vol%		
X-0393	TPM	70.0 vol%	HED-045 Phase 2	3 kg
	Epoxy	30.0 vol%		
X-0394*	TATB	47.5	HED-021 Phase 3 Addendum 13	100 kg
	HMX	48.7		
	Estane	3.8		
X-0395	PETN	96.5	HED-051 Phase 3	10 kg
	FPC 461	3.5		
X-0396	TATB	70.0	HED-021 Phase 3 Addendum 13	100 kg
	HMX	25.0		
	Estane	5.0		
X-0397	TATB	70.0	HED-021 Phase 3 Addendum 13	100 kg
	HMX	25.0		
	Kraton G	5.0		
X-0398	TATB	70.0	HED-021 Phase 3 Addendum 13	100 kg
	HMX	25.0		
	Kraton G	2.24		
	HyVac Oil	2.76		
X-0399	TATB	95.0	HED-021 Phase 3 Addendum 13	100 kg
	Viton A	5.0		

*Items added to page revision 6, X-0394 was inadvertently deleted from page revision 5.

10-26-83 DATE	SUBMITTED: DATE	SUBMITTED: DATE
APPROVED: 10/26/83	APPROVED: 10/24/83 DATE	APPROVED: DATE

Table 2 (Continued)

Experimental Code Number	Nominal Composition Weight Per Cent		Reference HED	Weight Limit
X-0400	PETN FPC-461 Exon	99.5 0.5	HED-051 Phase 3 Addendum 1	5 kg
X-0401	PETN Kel-F 800	99.5 0.5	HED-051 Phase 3 Addendum 1	5 kg
X-0402	PETN Kel-F 800	96.5 3.5	HED-051 Phase 3 Addendum 1	5 kg
X-0403	96.5 wt% HMX 1.57 Kraton G 1.93 Hyvac Oil		HED-035 Phase 3	90 kg
X-0404	98.5 wt% HMX 0.67 wt% Kraton G 0.83 wt% Hyvac Oil		HED-035 Phase 3	90 kg
X-0405	90.0 wt% HMX 0.89 Kraton G 1.11 Hyvac Oil		HED-035 Phase 3	90 kg
X-0406	97.2 HMX 1.27 Kraton G 1.53 Hyvac Oil		HED-035 Phase 3	200 lbs
X-0407*	69.8 wt% TATB 25.0 wt% PETN 5.0 wt% Kel-F 800 0.2 wt% Dye		HED-021 Phase 2	3 kg
X-0408*	97.5 wt% HMX 2.5 Vistalon 503		HED-052	150 g
X-0409*	97.5 wt% HMX 2.5 wt% Royalene 100		HED-052	150 g

*Item added to page revision 1.

SUBMITTED: 8-2-84 DATE	SUBMITTED: DATE	SUBMITTED: DATE
APPROVED: 8/2/84	APPROVED: 8/2/84 DATE	APPROVED: 8/8/ DATE

Table 2 (Continued)

Experimental Weight Code Number	Nominal Composition Weight Per Cent	HED	Reference Limit
X-0410	97.5 wt% HMX 1.25 wt% Polysar 306 1.26 wt% Tufflo 6026	HED-052	150 g
X-0411	97.5 wt% HMX 1.0 wt% Kraton G 1650 0.25 wt% Vistalon 457 1.25 wt% Tufflo 6026	HED-052	150 g
X-0412	79.0 wt% RDX 21.0 wt% FSL 7210	HED-008	3500 g
X-0413	79.0 wt% PETN 21.0 wt% FSL 7210	HED-008	3500 g
X-0414	84 wt% HMX 12.48 wt% R45M 0.52 wt% IPDI 3.0 wt% Dioctyl Adipate	HED-053	500 kg
X-0415	60 wt% HMX 40 wt% EAK	HED-048 Phase 3 Addendum 3	100 kg
X-0416	40 wt% HMX 60 wt% EAK	HED-048 Phase 3 Addendum 3	100 kg
X-0417	20 wt% HMX 80 wt% EAK	HED-048 Phase 3 Addendum 3	100 kg
X-0418	97.5 wt% HMX 1.12 wt% Kraton G 1650 1.38 wt% Synton PAO 100	HED-035	50 lb Phase 3

b. [illegible] 8-2-84 DATE	SUBMITTED: DATE	SUBMITTED: DATE
PROVED: 8-2-84 J. Parkinson DATE	APPROVED: 8/2/84 W. A. Bradley DATE	APPROVED: 8/8/78 HSE-3 DATE

Table 2 (Continued)

Experimental Weight Code Number	Nominal Composition Weight Per Cent	HED	Weight Limit
X-0419	97.5 HMX 2.5 Vistalon 404	HED-052	150 g
X-0420	94% DINGU 5% Exon 461 1% KR138S	HED-055	100 kg
X-0421	20 wt% TATB 80 wt% EAK	HED-048	100 kg
X-0422	97.5 HMX 2.5 Ep Syn 3007	HED-052	150 g
X-0423	97.5 HMX 2.5 Ep Syn 4006	HED-052	150 g
X-0424	79.0 wt% RDX 21.0 wt% NuSil CF1-3500	HED-008	3500 g
X-0425	79.0 wt% PETN 21.0 wt% NuSil CF1-3500	HED-008	3500 g
X-0426	95.0 wt% PYX 5.0% wt% Kel-F 800	HED-054	454 kg
X-0427	77% PETN 23% NuSil CF1-3500	HED-008	3500 g
X-0428	75 wt% PETN 25 wt% NuSil CF1-3500	HED-008	3500 g
X-0429	95 wt% DINGU 5 wt% Exon 461	HED-055	100 kg
X-0430	88% HMX 6% Kraton G-1650 6% Tufflo 6026 oil	HED-035	91 kg
X-0431	75% PETN 25% Nu-Sil CF2-3500	HED-008	3500 g

Table 2 (Continued)

Experimental Code Number	Nominal Composition Weight Per Cent	Reference HED	Weight Limit
X-0432	60% DINGU 40% TNT	HED-055 Add. 1	100 kg
U-0433	79.8% TATB (Micronized) 15.0% HMX (Ball Milled) 5.0% Kel-F 800 0.2% Dye	HED-021	100 kg
X-0434	64.8% TATB 30.0% PETN 5.0% KEl-F 800 0.2% Dye	HED-021 Add. 15	3 kg
X-0435	70% TATB 25% HMX (specially ground to Class E) 5% Estane	HED-021 Phase 3 Add. 13	100 kg
X-0436	90% HMX 7.4% CAB 2.5% NP 0.1% KR 138S	HED-056 Phase 2	3 kg
X-0437	85% HMX 11.2% CAB 3.7% NP 0.1% KR 138S	HED-056 Phase 2	3 kg
X-0438*	80.5% HMX 9.5% BDNPA/F 9.5% Estane 0.5% Calcium Stearate	HED-013 Add.8	100 kg
X-0439*	75% PETN 25% Nu-Sil CF3-3500	HED-008	3500 g
X-0440*	70% PETN 30% Nu-Sil CF3-3500	HED-008	3500 g
X-0441*	58% RDX 34% Viton 8% Calcium Tartrate	HED-057	15 kg

*Item added to page Revision 1

APPROVED

SUBMITTED: [illegible] 4/28/86 DATE	SUBMITTED: DATE	SUBMITTED: DATE
APPROVED: DATE	APPROVED: DATE	APPROVED: HSE-3 DATE

Table 2 (Continued)

Experimental Code Number	Nominal Composition Weight Per Cent	Reference HED	Weight Limit
X-0442	70% RDX 10% Kraton 10% Tufflo 6026 Oil 10% Calcium Tartrate	HED-057	15 kg
X-0443	85% TATB 15% Viton	HED-057	15 kg
X-0444	88% HMX 6% Estane 6% BDNPA/BDNPF	HED-013 Add. 8	100 kg
X-0445	80% PETN 20% Nu-Sil CF3-3500	HED-008 Phase 3 Add. 5	3500 g
X-0446*	50% RDX 35% Viton 15% Calcium Tartrate	HED-057 Phase 3 Add. 1	15 kg
X-0447*	58% RDX 10% Kraton 10% Tufflo 6026 Oil 22% Calcium Tartrate	HED-057 Phase 3 Add. 1	15 kg
X-0448*	80% TATB 20% Viton	HED-057 Phase 3 Add. 1	15 kg
X-0449*	60% RDX 25% Estane 15% Calcium Tartrate	HED-057 Phase 3 Add. 1	15 kg
X-0450*	60.9% TATB 35.0% HMX 4.1% Estane	HED-021 Phase 3 Add. 13	100 kg
X-0451*	78% PETN 22% Nu-Sil CF3-3500	HED-008 Phase 3 Add. 5	3500 g

*Item added to page Revision 0

SUBMITTED: [signature] DATE 7/3/86	SUBMITTED: DATE	SUBMITTED:
APPROVED: [signature] DATE 7/8/86 M. L. Parkinson	APPROVED: [signature] DATE 7/8/86 W. A. Bradley	APPROVED: [signature] for WCC DATE 8/11 HSE-3

Table 2 (Continued)

Experimental Code Number	Nominal Composition Weight Per Cent	Reference HED	Weight Limit
X-0452	78% PETN 22% Nu-Sil CF4-3500	HED-008 Phase 3 Add. 5	3500 g
X-0453	78% PETN 22% Nu-Sil CF5-3500	HED-008 Phase 3 Add. 5	3500 g
X-0454	58% RDX 15% Estane 10% CEF 17% Calcium Tartrate	HED-057 Phase 3 Add. 1	15 kg
X-0455	75% PETN 25% Nu-Sil CF5-3500	HED-008 Phase 3 Add. 5	3500 g
X-0456	70% PETN 30% Nu-Sil CF5-3500	HED-008 Phase 3 Add. 5	3500 g
X-0457	78% PETN 22% NuSil CF6-3500	HED-008 Add. 5	3500 g
X-0458	95% TATB (wet aminated) 4.8% Kel-F 800 0.2% Dioctyl Sebacate (Octoil-S)	HED-021 Phase 3 Add. 12	100 kg
X-0459*	95.6% TATB 4.38% EYPEL-F 0.02% 2,2-dichlorobenzoyl peroxide in silicone base (catalyst)	HED-021 Phase 2 Add. 18	3000 g
X-0460*	59% HMX 11.5% Kraton 11.5% TCP 18 CT	HED-057 Phase 3 Add. 1	15 kg

*Item added to Page Revision 1

SUBMITTED: 3/16/87 DATE	SUBMITTED: DATE	SUBMITTED:
APPROVED:	APPROVED:	APPROVED:

Table 2 (Continued)

Experimental Code Number	Nominal Composition Weight Per Cent	Reference HED	Weight Limit
X-0461	78% PETN 22% NuSil CF7-3500	HED-008 Phase 3 Add. 5	3500 g
X-0462*	97.8% TATB 2.0% Kraton G 1650 0.2% Hypalon 20	HED-021 Phase 3 Add. 12	250 kg
X-0463	97.47% HMX 1.25% Kraton G 1650 1.25% Tufflo 6026 Oil 0.03% Irganox	HED-035 Phase 3	250 kg
X-0464	≤60% TNT ≥40% Calcium Carbonate	HED-030 Phase 1 Add. 1	3 kg
X-0465	≤70% TNT ≥30% Oxamide	HED-030 Phase 2 Add. 1	3 kg
X-0466	≤70% TNT ≥30% Cyanuric Acid	HED-030 Phase 2 Add. 1	3 kg
X-0467	≤70% TNT ≥30% Zinc Oxide	HED-030 Phase 2 Add. 1	3 kg
X-0468	86% TATB 6% Vistanex MML-100 6% Tufflo 6026 2% 032-4500 Microballoons	HED-021 Phase 3 Add. 12	10 kg
X-0469*	CLASSIFIED COMPOSITION	HED-057 Phase 3 Add. 1	10 kg

*Item added to Page Revision 1

SUBMITTED: 3/8/88 DATE	SUBMITTED: DATE	SUBMITTED:
APPROVED: 3/10/88	APPROVED: 3/14/88	APPROVED:

Table 2 (Continued)

X-0470*	CLASSIFIED COMPOSITION	HED-057 Phase 3	15 kg
X-0471	75% HMX 25% Emulsion	HED-058 Phase 3	25 kg
X-0472	50% HMX 50% Emulsion	HED-058 Phase 3	25 kg
X-0473	25% HMX 75% Emulsion	HED-058 Phase 3	25 kg
X-0474	100% Emulsion	HED-058 Phase 3	25 kg
X-0475 *	CLASSIFIED COMPOSITION	HED-057 Phase 3	15 kg
X-0476 *	CLASSIFIED COMPOSITION	HED-057 Phase 3	15 kg
X-0477	70% HMX 30% Emulsion	HED-058 Phase 3	25 kg
X-0478	40% HMX 60% Emulsion	HED-058 Phase 3	25 kg
X-0479	30% HMX 70% Emulsion	HED-058 Phase 3	25 kg
X-0480	20% HMX 80% Emulsion	HED-058 Phase 3	25 kg
X-0481	10% HMX 90% Emulsion	HED-058 Phase 3	25 kg
X-0482	78% PETN 22% NuSil CF-2-3550	HED-008 Phase 3 Add. 5	3.5 kg

*Items added to Page Revision 0

SUBMITTED: 3/8/88 DATE	SUBMITTED: DATE	SUBMITTED:
APPROVED: 3/11/88	APPROVED: 3/8/88	APPROVED: 3/

Table 2 (Continued)

X-0483	95% NTO 5% Exon 461	HED-059 Phase 2	3.0 kg
X-0484	95% NTO 5% Viton A	HED-059 Phase 2	3.0 kg
X-0485	95% NTO 5% Kel-F 800	HED-059 Phase 2	3.0 kg
X-0486	95% NTO 5% Kraton 1650	HED-059 Phase 2	3.0 kg
X-0487	95% NTO 5% Estane 5703	HED-059 Phase 2	3.0 kg
X-0488	40% NTO 60% TNT	HED-060 Phase 2	3.0 kg
X-0489	50% NTO 50% TNT	HED-060 Phase 2	3.0 kg
X-0490	60% NTO 40% TNT	HED-060 Phase 2	3.0 kg
X-0491*	45% NTO 50% RDX 5% Viton A	HED-059 Phase 2 Add. 1	3.0 kg
X-0492*	45% NTO 50% RDX 5% Estane	HED-059 Phase 2 Add. 1	3.0 kg
X-0493*	45% NTO 50% RDX 5% FPC 461	HED-059 Phase 2	3.0 kg
X-0494*	45% NTO 50% RDX 5% Kel-F 800	HED-059 Phase w Add. 1	3.0 kg
X-0495*	45% NTO 50% RDX 5% Kraton 1650	HED-059 Phase 2 Add. 1	3.0 kg
X-0496*	60% HMX 40% Emulsion	HED-058 Phase 3	25 kg

*Item added to page Revision 0

SUBMITTED: 3/8/88 DATE	SUBMITTED: DATE	SUBMITTED:
APPROVED:	APPROVED:	APPROVED:

Table 2 (Continued)

X-0497	95% TATB 5% Polysar 306	HED-052 Phase 1	150 g
X-0498	95% TATB 5% Vistalon 404	HED-052 Phase 1	150 g
X-0499	95% TATB 5% Polyvinylidene Fluoride	HED-021 Phase 3	100 kg
X-0500	95% TATB 5% Poly(vinylidene Fluoride/ hexafluoropropylene)	HED-021 Phase 3	100 kg
X-0501	78% RDX 22% CF6-3500	HED-008 Phase 3 Add. 5	3500 g
X-0502*	50% Dinitrotolune 49.7% D-2wax 0.3% Dye	HED-061 Phase 2	3 kg
X-0503*	85% NTO 10% RDX 5% Estane	HED-059 Phase 2 Add. 1	3 kg
X-0504*	85% NTO 10% RDX 5% FPC 461	HED-059 Phase 2 Add. 1	3 kg
X-0505*	85% NTO 10% RDX 5% Kel-F 800	HED-059 Phase 2 Add. 1	3 kg
X-0506*	85% NTO 10% RDX 5% Kraton 1650	HED-059 Phase 2 Add. 1	3 kg
X-0507*	82% HMX 18% Estane	HED-013 Phase 3 Add. 9	100 kg

*Item added to page Revision 0

SUBMITTED:	SUBMITTED:	SUBMITTED:
[illegible] 3/24/88 DATE	DATE	
APPROVED: 3/31/88	APPROVED: [illegible] 3/31/88	APPROVED: Jack L. [illegible] 4/1/88

Table 2 (Continued)

X-0508	81% HMX 15% Estane 4% BDNPA/F Eutectic	HED-013 Phase 3 Add. 9	100 kg
X-0509	88% HMX 5.4% Kraton G 1650 6.6% Tufflo Oil	HED-035 Phase 3 Add. 4	250 kg
X-0510	85% NTO 10% RDX 5% Viton A	HED-059 Phase 2 Add. 1	3 kg
X-0511*	95% HMX 5% Vistalon 404	HED-035 Phase 3 Add. 4	250 kg
X-0512*	88% HMX 12% Vistalon 404	HED-035 Phase 3 Add. 4	250 kg
X-0513*	40% TNT 50% $CaCO_3$ (Calcium Carbonate) 10% Estane	HED-030 Phase 3 Add. 3	500 kg
X-0514*	45% TNT 50% $CaCO_3$ 5% Estane	HED-030 Phase 3 Add. 3	500 kg
X-0515*	40% TNT 50% Cyanuric Acid 10% Estane	HED-030 Phase 3 Add. 3	500 kg
X-0516*	40% TNT 50% Zinc Oxide 10% Estane	HED-030 Phase 3 Add. 3	500 kg
X-0517*	40% TNT 50% Oxamide 10% Estane	HED-030 Phase 3 Add. 3	500 kg
X-0518*	50% PETN 30% Pentaerythritol 20% Sylgard 182	HED-008 Phase 3 Add. 6	10 kg

*Item added to Page Revision 0

SUBMITTED:	SUBMITTED:	SUBMITTED:
5/24/88 DATE	DATE	
APPROVED:	APPROVED:	APPROVED:

Table 2 (Continued)

X-0519	60% PETN 20% Pentaerythritol 20% Sylgard 182	HED-008 Phase 3 Add. 6	10 kg
X-0520	70% PETN 10% Pentaerythritol 20% Sylgard 182	HED-008 Phase 3 Add. 6	10 kg
X-0521	50% TNT 40% $CaCO_3$ 10% Estane	HED-030 Phase 3 Add. 3	500 kg
X-0522*	80% RDX 20% CF6-3500	HED-008 Phase 3 Add. 5	3.5 kg
X-0523*	51% RDX 12.5% Estane 5703 12.5% CEF 24% Cyanuric Acid	HED-057 Phase 3	15 kg
X-0524*	95% TATB 4.8% Kel-F 800 0.2% Hypalon	HED-021 Phase 3 Add. 5	2000 kg
X-0525*	≤70% TNT ≥30% Calcium Carbonate Cab-o-sil	HED-030 Phase 2	2 kg
X-0526*	≤70% TNT ≥30% Calcium Carbonate Talc	HED-030 Phase 2	2 kg
X-0527*	97% TATB 3% Macrolon (Polycarbonate)	HED-21 Phase 3 Add. 12	100 kg
X-0528*	84% HMX 7.6% R45HT 7.6% DOA 0.8% IPDI	HED-053 Phase 3	25 kg

*Item added to Page Revision 0

SUBMITTED: R E Hatler 4/14/89 DATE	SUBMITTED: DATE	SUBMITTED:
APPROVED:	APPROVED:	APPROVED:

Table 2 (Continued)

X-0529	≤97.5% HMX ≥ 2.5% Vistalon 503	HED-035 Phase 3 Add. 4	250 kg
X-0530	Kinepak Mixture ≈80% An + sensitizers ≈20% NM	HED 062 Phase 2	3 kg
X-0531	98% TATB 2% Polysar 306	HED 021 Phase 3 Add. 5	250 kg
X-0532	98% TATB 2% Vistalon 404	HED 021 Phase 3 Add. 5	250 kg
X-0533	40% TNT 55-60% Calcium Carbonate 0-2% Talc 1-2% Microballoons	HED-030 Phase 3 Add. 4	500 kg
X-0534	50% TNT 16-24% Calcium Carbonate 25-33% Talc 1-2% Microballoons	HED-030 Phase 3 Add. 4	500 kg

Table 2 (Continued)

X-0529	≤97.5% HMX ≥ 2.5% Vistalon 503	HED-035 Phase 3 Add. 4	250 kg
X-0530	Kinepak Mixture ≈80% An + sensitizers ≈20% NM	HED 062 Phase 2	3 kg
X-0531	98% TATB 2% Polysar 306	HED 021 Phase 3 Add. 5	250 kg
X-0532	98% TATB 2% Vistalon 404	HED 021 Phase 3 Add. 5	250 kg
X-0533	40% TNT 55-60% Calcium Carbonate 0-2% Talc 1-2% Microballoons	HED-030 Phase 3 Add. 4	500 kg
X-0534	50% TNT 16-24% Calcium Carbonate 25-33% Talc 1-2% Microballoons	HED-030 Phase 3 Add. 4	500 kg
X-0535*	95% TZX 5% OXY-461	HED-064 Phase 2	3 kg
X-0536*	20-30% RDX 50-65% ZnO 14-20% R45HT/IPDI Binder	HED-063 Phase 2	3 kg
X-0537*	≤90% HMX ≥10% R45T/IPDI Type Binder	HED-053 Phase 3 Rev. 1	25 kg
X-0538*	20-80% TATB 20-80% NTO 0-10% Kel-F 800	HED-059 Phase 2 Add. 3	3 kg

*Item added to Page Revision 0

SUBMITTED: [signature] 4/25/90 DATE	SUBMITTED: DATE	SUBMITTED:
APPROVED: [signature] 4/30/90 DATE	APPROVED: WM. A. Bradley 5/2/90 W. A. Bradley DATE	APPROVED: HSE-3

Table 2 (Continued)

Experimental Code Number	Nominal Composition Weight Per Cent	Reference HED	Weight Limit
X-0539	44% RDX (Micronized) 12.5% Estane 5703 12.5% CEF 31% Cyanuric Acid	HED-057 Phase 3 Add. 2	15 kg
X-0540	39% RDX (Micronized) 12.5% Estane 5703 12.5% CEF 31% Cyanuric Acid	HED-057 Phase 3 Add. 2	15 kg
X-0541	69.8% TATB 25.0% PETN 5.0% Kel-F 800 0.2% Blue Dye (Freon Process)	HED-021 Phase 3 Add. 16	100 kg
X-0542	95% TATB 5% L-9267, Fluoroplastic terpolymer (3M)	HED-021 Phase 3 Add. 5	250 kg
X-0543	95% TATB 5% Kel-F 3700	HED-021 Phase 3 Add. 5	250 kg
X-0544	26% TATB 74% Ammonium Nitrate	HED-066 Phase 2	3 kg
X-0545	76% RDX 12% Cellulose Acetate Butyrate (CAB) 7.6% Acetyl Triethyl-citrate (ATEC) 4.0% Nitrocellulose 0.4% Ethylcentralite	HED-056 Phase 2 Add. 2	3 kg

SUBMITTED:	SUBMITTED:	SUBMITTED:
2/27/91 DATE	DATE	
APPROVED: 3/4/91	APPROVED: 3/4/91	APPROVED:

DISPOSAL OF HE CONTAMINATED WASTE BY BURNING

Page 1, Revision 10
Page 2, Revision 9
Page 3, Revision 9
Page 4, Revision 7
Page 5, Revision 0 - Obsolete

APPROVED _____ DATE 5-20-87
M. J. Barr

APPROVED _____ DATE 5-20-87
R. A. Hildner, Assoc. Grp. Leader, WX-3

APPROVED _____ DATE 5-20-87
J. L. Parkinson, Group Leader, WX-3

APPROVED _____ DATE 5-20-87
for W. A. Bradley, Asst. Division Leader, WX

APPROVED _____ DATE 5/20/87
for A. M. Valentine, Group Leader, HSE-1

APPROVED Jack L. Bacastow for W. C. C. DATE 5/20/87
W. C. Courtright, Group Leader, HSE-3

DISPOSAL OF HE CONTAMINATED WASTE BY BURNING

I. SCOPE

A. In compliance with the air quality regulations of the State of New Mexico, uncontaminated waste will not be burned in the open incinerator at S-Site. Uncontaminated waste generated in the S-Site explosives area will be disposed of following the appropriate section of Group WX-3 SOP 12.1.2

* B. Potentially HE contaminated waste, collected as described in WX-3 SOP 12.1.2, may be disposed of by burning in the open incinerator located at the S-Site explosive area. The potentially HE contaminated wasted may be loaded into the incinerator by either Pan Am or WX-3 disposal personnel, however, only WX-3 personnel may burn waste in the incinerator.

II. LOCATION

* WX-3 incinerator is located in the S-Site Explosives Area.

III. EQUIPMENT

A. Incinerator

B. Temporary roadblock

C. Excelsior

D. Safety matches (matches must be kept in a metal can, GS-2499).

E. Kerosene

NOTE: Items C through E, above, must be stored in Building TA-16-77 when they are not being used.

*Indicates change

IV. LIMITS

A. Explosives

Only potentially HE contaminated, burnable waste.

B. Personnel

Five at the incinerator.

V. LOADING THE INCINERATOR

A. The incinerator will not be loaded while the temporary roadblock is in position across the driveway.

B. When a truck has been loaded with potentially HE contaminated waste, it will be driven to the incinerator. The gates on the incinerator will be opened and the truck backed into the unloading position. The brake will be set and a rear wheel blocked.

Dempster Dumpsters will be transported to the incinerator by Pan Am personnel.

C. The waste will be unloaded from the truck into the incinerator. While the material is being unloaded, care must be exercised to assure that every piece of waste goes into the incinerator and that none is allowed to escape and litter the burning area.

D. After the truck or dumpsters are unloaded, the incinerator gate will be closed and the trucks driven from the burning area.

* E. If plastic bags are observed, the contents shall be dumped and the bag given to the Senior Disposal Technician for disposal.

VI. BURNING THE WASTE

A. When the incinerator's contents are ready to be burned, a temporary roadblock will be placed in position across the driveway.

B. The gate on the incinerator will be closed before the burn is started.

C. A train of excelsior, approximately two feet long, will be placed in contact with the waste in the incinerator.

D. Approximately one quart of kerosene will be poured on the train and waste.

VI. (cont.)

E. Items C and D, above, may be omitted if the waste is dry.

F. The train or trash will be lit with a safety match. The matches and unused materials will be returned to Building 77.

G. The temporary roadblock will be removed when there are no smoldering ashes in the incinerator.

H. The incinerator may be reloaded after the temporary roadblock has been removed.

I. Each burn will be recorded on Form WX-3-70.

VII. CLEANING THE INCINERATOR

When it becomes necessary, Group WX-12 will be requested to issue an order requesting Pan Am to remove the ashes from the incinerator. Disposal of the ashes will be in accordance with approved Laboratory procedures.

IGNITION, BURNING, AND FLASHING OF EXPLOSIVES AND EXPLOSIVE-CONTAMINATED MATERIAL

Page 1, Revision 7
Page 2, Revision 7
Page 3, Revision 8
Page 4, Revision 8
Page 5, Revision 8
Page 6, Revision 7
Page 7, Revision 8
Page 8, Revision 2

APPROVED M. J. Barr DATE 10-28-87
M. J. Barr, Unit Supervisor

APPROVED M J Barr for R. A. H. DATE 10-29-87
R. A. Hildner, Section Leader, WX-3

APPROVED J. L. Parkinson DATE 10/29/87
J. L. Parkinson, Group Leader, WX-3

APPROVED W. A. Bradley DATE 11/2/87
W. A. Bradley, Asst. Division Leader, WX

APPROVED Not Rec'd DATE _____
A. M. Valentine, Group Leader, HSE-1

APPROVED Jack T. Baardson DATE 11/25/87
W. C. Courtright, Group Leader, HSE-3
PNG 11/20

ESA

STANDARD OPERATING PROCEDURE

FOR

IGNITION, BURNING AND FLASHING OF EXPLOSIVES AND EXPLOSIVE-CONTAMINATED MATERIAL

Prepared By:_____**Date**_____
Cindy Sandoval, ESA-WMA

Approved By:_____**Date**_____
Douglas Hemphill, Team Leader
Materials Section, ESA-WMA

Approved By:_____**Date**_____
L. A. Stretz, Group Leader, ESA-WMA

Approved By:_____**Date**_____
Roger Goldie, Safety Officer, ESH-5

Los Alamos
National Laboratory

CONTROLLED DOCUMENT

Users have the ultimate responsibility to ensure that they are working with the latest revision of the controlled document.

Copy Number

1.0 SCOPE

The procedures outlined in this SOP will be followed in igniting and burning or flashing all materials at the burning ground.

The Disposal Unit Supervisor refers to that person or a qualified designee fully trained per ESA SOP 12.1.0.

2.0 LOCATION

Burn Trays TA-16-388, 394, and 399; Flash Pad TA-16-387; Filter Vessels TA-16-401 and 406; Control Shelter TA-16-389; and Gate, Structure TA-16-349.

3.0 LIMITS

3.1 Personnel

Two

3.2 Explosives

See ESA SOP for particular disposal operation

4.0 ALLOWABLE EXPLOSIVES

Explosives approved for disposal by ESA-WMA are those listed in of ESA SOP 1.1.0., Tables 1 and 2.

5.0 EQUIPMENT

5.1 Burning ground firing circuit (ENG-C-23444)

5.2 Periscope (13Y-101920)

5.3 Blasting machine (10-cap capacity) Fidelity Electric Company (S/N 10-62SA).

5.4 Squibs (S-94) ESA-WMA Code Number 225-03, or similar DuPont S-series squibs.

5.5 Blaster's Multimeter, Model 101.

6.0 MATERIALS

6.1 Excelsior

6.2 Kerosene

7.0 AREA CLEARANCE

When the Disposal Unit Supervisor in charge of operations has determined that a burning area has been satisfactorily loaded and is ready to be burned, a check of the burn ground will be made. Personnel who are to remain during the burn operation will assemble in the control shelter. All others will leave the area. An operator will check to make sure that the gate on the access road (Structure 349) is closed. If it is open, he will notify the Disposal Unit Supervisor and another check of the area will be made before the burning operation continues. If it is closed, the operator will return to the control shelter.

8.0 PROCEDURE

8.1 A permanent selective firing circuit is installed at the burning ground. The master controls are located inside Control Shelter 389. Proper setting of the controls directs an electrical pulse that will fire the ignition squibs at any one of the burn areas. The permanent firing circuit will always be used for igniting the squibs at the burning ground except in cases of power outage or circuit failure. In that event, it will be permissible to use the blasting machine to ignite the squibs.

8.2 All motor vehicles at the burning ground will be parked at Control Shelter 389 with their radios turned off.

8.3 The Disposal Unit Supervisor will check the radio located in the control shelter to make sure that it is turned off.

8.4 Ignition and Burning

8.4.1 The Disposal Unit Supervisor will determine that the firing controls are locked in the OFF position. The key to the lock will be kept in the possession of the Disposal Unit Supervisor during the remainder of the burning operation.

8.4.2. Squibs, excelsior, and kerosene will then be collected at Control Shelter 389.

8.4.3 The Disposal Unit Supervisor will proceed on foot to the material to be burned with the materials listed in Item D.2, above.

8.4.4 The Disposal Unit Supervisor will check the circuit breaker in the terminal box at the burning area to make sure it is in the GROUND position and that the alligator clips are disconnected from the two lead wire reels.

8.4.5 An ignition train will be prepared by building a 1 to 2 foot long strip of excelsior up to the material to be burned. The excelsior will be dampened with kerosene.

8.4.6 The Disposal Unit Supervisor will examine of the integrity of existing wire and if necessary, remove enough wire from the two reels located in the terminal box to reach the ignition train. At the terminal box, the end of each lead wire will be connected to one of the two alligator clips in the box. The circuit is then ready for two squibs to be spliced in parallel to the end of the wires. The spliced wires must be kept separated. If there is danger of the splices touching the explosive or some conductor, it must be insulated with electrician's tape.

8.4.7 The squibs will be placed approximately one inch from the excelsior so that the squibs, when fired, will light the ignition train. Do not place squibs within the excelsior as there is a possibility of snuffing the squib before ignition.

8.4.8 The circuit breaker in the terminal box at the burning area will be thrown to the fire position.

8.4.9 A continuity check will be made on the squib circuit from the terminal box outside the fence of the burning pit by using the approved multimeter.

8.4.10 The Disposal Unit Supervisor will proceed to the control shelter.

8.4.11 The Disposal Unit Supervisor will employ the following sequence in firing the squibs:

8.4.11.1 Unlock the firing controls and rotate the selector switch to the number that corresponds to the identifying number of the area being burned.

8.4.11.2 Turn the circuit breaker switch behind the fire button to the ON position.

8.4.11.3 Press the fire button to energize the circuit.

8.4.11.4 An observer should confirm squib firing and ignition by using the periscope located in the control shelter.

8.4.12 Squib failures will be handled as follows:

8.4.12.1 If no evidence of squib ignition was observed the Disposal Unit Supervisor will repeat the firing procedure.

8.4.12.2 If ignition is not obtained on a second attempt the firing circuit should be saved and the burn tray observed for a minimum of five minutes.

8.4.12.3 When the Disposal Unit Supervisor considers the burn tray area safe, he may proceed to the tray to review hook-up wire integrity. The Unit Supervisor may be accompanied by no more than one person when investigating a failure.

8.4.12.4 Should the cause of squib failure not be determined, the pad will be cleared and the HE and/or inert may be placed in a magazine or burned on the second tray. The responsible engineer should be notified.

8.4.13 Ignition train failures will be handled as follows:

8.4.13.1 If there is evidence of squib initiation (flash upon squib initiation) but the excelsior train or HE does not appear to burn, the pad should be viewed from the control building for a minimum of 30 minutes past the last visual indication of smoke.

8.4.13.2 The firing circuit should be saved and the Disposal Unit Supervisor and/or responsible engineer may then approach the burn tray. Ignition problems have occurred from:

8.4.13.2.1 Squib placement too close (less than 1") or too far (greater than about 6-8") from the excelsior.

8.4.13.2.2 Inadequate wetting (from kerosene) of the excelsior.

8.4.13.2.3 HE or inert material did not sustain burning.

8.4.13.2.4 Squib position changed between setup and ignition (wind or movement of refractory brick).

8.4.13.3 A new ignition train should be fabricated using new squibs and additional excelsior and kerosene as necessary.

8.4.14 When it has been determined that the ignition train has ignited, the Disposal Unit Supervisor will:

8.4.14.1 Rotate the selector switch to the OFF position,

8.4.14.2 Lock the firing controls, and

8.4.14.3 Turn the circuit breaker switch behind the fire button to the OFF position.

8.4.15 The vehicle radios and the radio located in the control shelter may then be turned on.

8.4.16 When the materials that are being burned have been reduced to a smoldering condition, the crew may leave the burning ground. A minimum of 24 hours must lapse after burning before ashes and other debris can be collected. Ashes will be disposed of in accordance with SOP 12.1.0., paragraph 6.18.1 and 2.

8.4.17 The key for the firing control circuit will be placed in the squib storage box in the storage room at the control shelter. The key will always be kept in this box when not in the possession of the Disposal Unit Supervisor.

8.4.18 A record of each burn will be noted on Form WX-3-70.

8.5 Use of Blasting Machine

8.5.1 Preparation

8.5.1.1 In the event that the burning ground selective firing circuit is inoperative and the explosive material is of such a nature that its destruction is urgent, the blasting machine may be used to ignite the squibs.

8.5.1.2 No part of the selective firing circuit will be used in conjunction with the blasting machine.

8.5.1.3 A temporary firing wire will be laid along the ground from the control shelter to the area to be burned. The Disposal Unit Supervisor will positively connect the bared ends of the firing wire at the control shelter and the burning area to get rid of any static electricity that may have accumulated in the wire.

8.5.1.4 The Disposal Unit Supervisor must be in possession of the blasting machine at all times during the rest of the burning operations, as described in the following paragraphs.

8.5.2 Ignition and Burning

8.5.2.1 The blasting machine, squibs, excelsior, and kerosene will be collected at Control Shelter 389.

8.5.2.2 The Disposal Unit Supervisor will proceed on foot to the material to be burned with the materials listed in Item 8.5.2.1, above.

8.5.2.3 An ignition train will then be prepared by putting a wad of excelsior about 1 to 2 feet long on the material to be burned. The excelsior will be dampened with kerosene. The ignition train must be arranged so that both it and the explosives burn toward the direction from which the wind is blowing.

8.5.2.4 The Disposal Unit Supervisor will then connect two squibs to the temporary firing line and will make sure that the squibs are wired in series. The spliced wires must be kept separated. If there is danger of the splices touching the explosive or some conductor, it must be insulated with electrician's tape.

8.5.2.5 The squibs will then be placed in the excelsior so that the squibs, when fired, will light the ignition train.

8.5.2.6 The Disposal Unit Supervisor will then proceed to the control shelter.

8.5.2.7 The Disposal Unit Supervisor will fasten the lead wires to the blasting machine and energize the circuit.

8.5.2.8 The Disposal Unit Supervisor, will then check to see whether the ignition train is ignited by using the periscope in the control shelter.

8.5.2.9 If the materials fail to burn, the Disposal Unit Supervisor will proceed as follows:

8.5.2.9.1 Disconnect the blasting machine and positively connect the bared ends of the wire to get rid of any residual electrical charge in the circuit.

8.5.2.9.2 Repeat firing procedure.

8.5.2.9.3 Wait 30 minutes and then, after surveying the area with the periscope, proceed to the area and inspect the squibs and other parts of the firing system.

8.5.2.9.4 When necessary, the used squibs may be replaced by new ones, and the appropriate parts of Item 8.5.2.1 through 8.5.2.7, above, may be repeated.

8.5.2.9.5 Faulty squibs will be collected for subsequent disposal by flashing with other

HE-contaminated unburnable material, in accordance with ESA SOP 12.3.6.

8.5.2.9.6 Each time a failure occurs, the Disposal Unit Supervisor will disconnect the bared ends of the wire to get rid of any residual electrical charge in the circuit. Wait 30 minutes before proceeding to inspect the squibs and other parts of the firing circuit.

8.5.2.10 When the materials that are being burned have been reduced to a smoldering condition, the crew may leave the burning ground. A minimum of 24 hours must lapse after burning before the ashes and other debris can be collected. Ashes will be disposed of in accordance with ESA SOP 12.1.0, paragraph 6.18.1 and 2.

8.5.2.11 The vehicle radios and the radio in the control shelter may then be turned on.

8.5.2.12 The blasting machine will be placed in the squib storage box in the storage room at the control shelter. The blasting machine will always be kept in this box when not in the possession of the Disposal Unit Supervisor.

8.5.2.13 A record of each burn will be noted on Form WX-3-70.

APPENDIX E

Standard Operating Procedures
for
Flashing and Disposal of Unburnable Materials
and
Disposal of HE Pieces Weighing Over 25 Kilograms

FLASHING AND DISPOSAL OF UNBURNABLE MATERIALS

Page 1, Revision 7
Page 2, Revision 7
Page 3, Revision 8
Page 4, Revision 7

APPROVED M. J. Barr DATE 10-28-87
M. J. Barr, Unit Supervisor

APPROVED R. A. Hildner DATE 10-28-87
R. A. Hildner, Section Leader, WX-3

APPROVED J. L. Parkinson DATE 10/29/87
J. L. Parkinson, Group Leader, WX-3

APPROVED Wm. A. Bradley DATE 11/2/87
W. A. Bradley, Asst. Division Leader, WX

APPROVED NOT REQUIRED DATE
A. M. Valentine, Group Leader, HSE-1

APPROVED Jack L. Bacon for W.C.C. DATE 1/7/88
W. C. Courtright, Group Leader, HSE-3
RHG 12/23

ESA

STANDARD OPERATING PROCEDURE

FOR

FLASHING AND DISPOSAL OF UNBURNABLE MATERIALS

Prepared By:_____**Date**_____
Cindy Sandoval, ESA-WMA

Approved By:_____**Date**_____
D. A. Hemphill, Team Leader, ESA-WMA

Approved By:_____**Date**_____
L. A. Stretz, Group Leader, ESA-WMA

Approved By:_____**Date**_____
Roger Goldie, Safety Officer, ESH-5

Los Alamos
National Laboratory

CONTROLLED DOCUMENT

Users have the ultimate responsibility to ensure that they are working with the latest revision of the controlled document.

Copy Number

1.0 SCOPE

The procedures outlined in this SOP concern the flashing and disposal of unburnable materials that have been used in HE processing areas. Since all materials from HE processing areas are considered to be potentially HE contaminated they are flashed for safety reasons to destroy any HE contamination. The materials are then disposed of at a LANL landfill as administratively controlled non-hazardous waste.

The Disposal Unit Supervisor refers to that person or a qualified designee fully trained per ESA SOP 12.1.0.

2.0 LOCATION

Pit TA-16-387, Burning Pit
TA-16-386, Storage Pad
TA-16-389, Control Shelter & gate
TA-16-349, Structure.

3.0 EQUIPMENT

2.1 Burning ground stands (SK-4377 D-1)
2.2 Wire screen (SK-4377 D-1, Item D)
2.3 Kindling wood or scrap lumber
2.4 Kerosene or Excelsior
2.5 Chain Link Fencing

4.0 LIMITS

4.1 Explosives

HE-contaminated unburnable materials

4.2 Personnel

Four (4) at Flash Pad 387
Five (5) at Control Shelter 389

5.0 PROCEDURE

5.1 HE-Contaminated Materials

5.1.1 Preparation and Inspection

Materials to be flashed will be inspected for presence of reservoirs of oils, other fluids and excessive deposits of explosives which will be removed for disposal on burn pads or pans on the flash pad. Small quantities (<5#) of plastics are allowable. Inspection covers will be removed as appropriate. Suspected materials such as asbestos or other insulating materials will be identified and removed in accordance with lab procedures. All valves on sealed container will be opened or removed.

5.1.2 Receiving and Placing

5.1.2.1 ESA disposal personnel will deliver explosives-contaminated unburnable materials to the burning ground. Any other personnel involved in the delivery will be supervised by the Disposal Unit Supervisor. Storage pad 386 may be used to store HE-contaminated unburnable materials until enough have been collected to justify a flashing operation.

5.1.2.2 Kindling wood or scrap lumber will be placed on the bottom grill of the burning ground stands or around equipment. The total amount of wood to be used will be determined by the type and quantity of materials to be flashed. In all cases, there must be a sufficient quantity of wood to ensure that the flashing will be complete and no significant HE contamination will remain. Cardboard, wood, and paper from the incinerator transportainer may also be used.

5.1.2.3 The Disposal Unit Supervisor will supervise the unloading of trucks and placing of the materials on the stands. For small items, such as valves, a wire screen will be placed on top of the stands. This will hold the materials above the fire for proper flashing.

5.1.2.4 If it appears that it would be more convenient to place the materials on the sand for flashing, this is permitted. The Disposal Unit Supervisor must be sure that the placement of the wood will properly heat all the materials to ensure a satisfactory flashing job. If

appropriate, chain link fencing may be placed under the material to be flashed. The fencing may be gripped at the corners to remove loose, flashed materials to the assembly pad.

5.1.2.5 The flashing operation, will be performed in accordance with ESA SOP 12.5.1.

5.1.3 Disposal

5.1.3.1 On the first workday after the flashing operation (a minimum of 24 hours must lapse), the Disposal Unit Supervisor will inspect the flashed materials to determine whether they have been completely flashed. Indications include evidence of heat treatment such as discoloration or paint charing on the surfaces. If the materials is not satisfactorily flashed, the appropriate steps of this SOP and ESA SOP 12.5.1 will be repeated to ensure complete flashing.

5.1.3.2 Completely flashed materials may be stored at the burning grounds as non-hazardous waste in an assembly area just outside the 387 fenced area until a suitable quantity is accumulated for disposal.

5.1.3.3 When sufficient quantities of flashed materials have accumulated they will be disposed of as non-hazardous administratively controlled waste through approved procedures designated by ESH and CST Divisions.

5.1.3.4 A record of all flashing operations and inspections will be kept on Form WX-3-70 or M&E Building 389 computer as appropriate

5.2 Uncontaminated Materials

5.2.1 "Unburnable, Uncontaminated" materials that are sent to the burning ground through the regular trash collection system (see ESA SOP 12.1.2) will be examined by disposal personnel to make sure that no HE contamination is present. If there is any indication that HE contamination is present, the materials will be flashed in accordance with the appropriate sections of this SOP. After it has been determined by disposal personnel that no HE contamination is present, the materials may be held with flashed materials without being flashed. A record of all materials that are disposed of without being flashed will be kept on Form WX-3-70.

5.2.2 Open fire flashing is very effective in eliminating HE contamination of non-burnable waste. <u>However, Laboratory policy dictates that these wastes remain under institutional control.</u> Therefore, these materials will be disposed of by CST Division in a controlled burial site only.

DISPOSAL OF HE PIECES WEIGHING OVER 25 KILOGRAMS (55 POUNDS)

Page 1, Revision 8
Page 2, Revision 9
Page 3, Revision 7
Page 4, Revision 8

APPROVED M. J. Barr DATE 9-24-87
M. J. Barr

APPROVED R. A. Hildner DATE 9-27-87
R. A. Hildner, Section Leader, WX-3

APPROVED J. L. Parkinson DATE 9/29/87
J. L. Parkinson, Group Leader, WX-3

APPROVED W. A. Bradley DATE 10/2/87
W. A. Bradley, Asst. Division Leader, WX

APPROVED NOT REQUIRED DATE
A. M. Valentine, Group Leader, HSE-1

APPROVED Jack L. Bacastow for W. C. C. DATE 11/16/87
W. C. Courtright, Group Leader, HSE-3
EHG 11/13

ESA

STANDARD OPERATING PROCEDURE

FOR

DISPOSAL OF HE PIECES WEIGHING OVER 25 KILOGRAMS (55 POUNDS)

Prepared By: _____ Date _____

Approved By: _____ Date _____
D. A. Hemphill, Section Leader, WX-3

Approved By: _____ Date _____
L. A. Stretz, Group Leader, WX-3

Approved By: _____ Date _____
W. A. Bradley, Division Operations Coordinator, WX-DO

Approved By: _____ Date _____
P. D. Whitehead, Safety Officer, HS-5

Approved By: _____ Date _____
N. L. Shalkowski, X-ray Device Control Office, HS-12

1.0 SCOPE

This SOP governs the disposal by burning of cast or pressed HE pieces that weigh over 25 kilograms each. No HE pieces will be burned that have permanently mounted detonators, MDF arrays, or booster pellets on them. No HE pieces will be burned that contain metals or other materials that could produce shrapnel in the event of a detonation.

2.0 LOCATION

Burning Pit areas TA-16-388 and 399; Control Shelter TA-16-389; and gate, Structure TA-16-349.

3.0 LIMITS

3.1 Explosives

1000 pounds per tray, including 100 pounds of flake TNT. No single piece or assembly will exceed 250 pounds.

3.2. Personnel

3.2.1 Four at Burning Pit Areas 388 or 399
3.2.2 Five at Control Shelter 389

4.0 EQUIPMENT

4.1 Burning ground firing circuit (ENG-C-23444)
4.2 Periscope (13Y-101920)
4.3 Blasting machine (US Army, 10-cap capacity), White-Rodgers Electric Company, Type 6901, Number 1
4.4 Boom truck
4.5 HE van
4.6 Sling (SK-7022 C-1)
4.7 Floor trucks
4.8 Group WX-3 HE transportation containers
4.9 Destruction tray (13Y-47523) with box cover (13Y-47538 C-1) (Lid A)

5.0 MATERIALS

5.1 Squibs (S-94), WX-3 Code Number 225-03 or similar DuPont S-Series squibs
5.2 Excelsior
5.3 Kerosene
5.4 48" wide roll type packing material (asphalt saturated), 15-pound weight

6.0 PROTECTIVE APPAREL

See WX-3 SOP 12.1.0 V.C

7.0 HANDLING

Mechanized and manual handling will be done in accordance with WX-3 SOPs 14.1.1 through 14.1.4.

8.0 AREA CLEARANCE

A check will be made of the burning ground to make sure that all unauthorized personnel leave the burning ground and that the gate, Structure 349, is closed.

9.0 PROCEDURE

9.1 Receiving and Placing

9.1.1 The HE van may be used to deliver HE pieces weighing up to 100 pounds to the burning pit. The explosives-loaded floor trucks will be off-loaded manually from the van just inside the entrance gates. After floor truck unloading, the floor truck will be loaded on the van. The van will then be driven to Control Shelter 389, parked, and the motor turned off, or it may leave the burning ground area.

9.1.2 HE pieces that weigh more than 100 pounds will be delivered to the burning pit using the boom or flat bed truck. The truck will be backed into the fenced area of the pit, and the truck boom will be used to set the HE-laden destruction trays on the prepared burn tray or designated area. After placement of the HE, the truck will be driven to Control Shelter 389, parked, and the motor turned off, or it may leave the burning ground area. It is permissible to use a fork lift to remove and place exceptionally large pieces.

9.1.3 Up to 100 pounds of TNT may be used to form a flame train between HE pieces and to ensure complete burning. The TNT train must not exceed three inches in depth.

9.1.4 The tops of the destruction trays (if used) will be removed before the burn is made.

9.2 Burning

9.2.1 An ignition train will then be prepared by placing a wad of excelsior about 15 inches long on the previously placed 48" wide roll type packing material. Excelsior will also be spread over, and in contact with, nearby pieces. Flake TNT will be used to form a flame train leading from the ignition point to all HE pieces in the burn.

9.2.2 Burning of the HE will be done in accordance with WX-3 SOP 12.5.1.

9.3 Cleanup and Disposal

9.3.1 At least 24 hours, but not more than 36 hours must lapse after burning the HE before another burn can take place on the same tray or area. Ashes will be disposed of in accordance with SOP 12.1.0, paragraph VI.R.1 and 2.

9.3.2 A record of which pit area was used each day will be kept on Form WX-3-70.

APPENDIX F

Standard Operating Procedures
for
Collection and Drying of Explosives Waste from Settling Tanks

ESA

STANDARD OPERATING PROCEDURE

FOR

COLLECTION AND DRYING OF EXPLOSIVES WASTE FROM SETTLING TANKS

Prepared By:_____**Date**_____
C. W. Sandoval, ESA-WMM

Approved By:_____**Date**_____
D. A. Hemphill, Team Leader
Materials Section, ESA-WMM

Approved By:_____**Date**_____
L. A. Stretz, Group Leader, ESA-WMM

Approved By:_____**Date**_____
Roger Goldie, Safety Officer, ESA-FM/ESH-5

Los Alamos
National Laboratory

CONTROLLED DOCUMENT

Users have the ultimate responsibility to ensure that
they are working with the latest revision of the controlled document.

1.0 SCOPE

Settling tank sumps are used to settle out the explosives draining from operating bays. The settled-out explosives are removed from settling tanks using a vacuum tank mounted on a truck and then transported to the ESA S-Site burn ground for disposal. Each settling tank is equipped with a wire mesh basket to trap large pieces of HE or other materials. Disposal personnel will empty these baskets each time they pick up a load of waste from the settling tank. At all other times, it will be the responsibility of the building Lead Operator to see that these baskets are maintained in good operating condition, and not allowed to become so full of large pieces of material that it overflows into the settling tank.

The Disposal Unit Supervisor refers to that person or a qualified designee fully trained per ESA SOP 12.1.0.

2.0 LOCATION

All buildings equipped with settling tanks for collecting explosives at TA-9, TA-11, TA-14, TA-16, TA-22, and TA-40; Filter Vessels TA-16-401 and 406; Air Heater TA-16-402; gate, Structure TA-16-349; Control Shelter TA-16-389, and Wastewater Treatment Facility TA-16-363.

3.0 EQUIPMENT

3.1 Vacuum tank (PN 213459) on a truck
3.2 Plastic bags
3.3 Corrugated cardboard boxes (GS-2513 through GS-2523)
3.4 Spark proof hand tools, rakes, shovels, and plastic scoops
3.5 Wooden rod
3.6 Aluminum platform

4.0 LIMITS

4.1 Explosives

4.1.1 Approximately 500 gallons of water HE slurry in vacuum tank.

4.1.2 Each filter vessel: maximum of three-inch layer spread over surface (approximately 750 pounds).

4.2 Personnel Limits

4.2.1 Four at settling tanks and Filter Vessels 401 or 406.

4.2.2 Five at Control Shelter 389.

5.0 PICKUP FREQUENCY

5.1 TA-11 and TA-16

Building Lead Operators will make frequent checks of the settling tanks under their jurisdiction and will notify the Disposal Unit Supervisor when tanks need to be cleaned. Form WX-3-976 will be used to record the pickup of waste from the settling tanks, and Form WX-3-1023 will be used to record inspections of the settling tanks.

5.2 TA-9, TA-14, TA-22, and TA-40

Settling tank waste pickups will be made when requested by TA-9, TA-14, TA-22, and TA-40 personnel.

6.0 COLLECTION PROCEDURE

6.1 The Disposal Unit Supervisor will check and clear with the Building Lead Operator at each building before beginning operations at that location.

6.2 A vacuum will be drawn on the vacuum tank using the vacuum system at building 389 (preferred) or the vacuum system in building 300 or 302 before the operation. The vacuum will not be drawn on the vacuum tank while the suction operation on the settling tank is being performed.

6.3 The truck will be positioned next to the settling tank so that the flexible intake hose will easily reach the bottom and all corners of the tank.

6.4 Any material that may be in the small wire baskets, located at the inlet to the settling tank, will be placed in plastic bags and packaged in cardboard boxes. This material will be transported to the Burn Ground. It will be dried and burned with the sump waste in filter vessels according to ESA ESA SOP 12.3.6.

6.5 The flexible hose will be inserted into the HE slurry at the bottom of the tank, and the valve between the hose and the vacuum tank opened. Control of the HE slurry flow will be accomplished using this valve.

6.6 A sight port in the vacuum tank will allow the operator to determine the slurry level. A liquid level halfway up the sight port is approximately 500 gallons. Sump waste may be picked up as long as sufficient vacuum remains.

6.7 After completion of the settling tank cleaning operations, the truck will be driven to Filter Vessels 401 or 406 at the ESA burn ground.

6.8 The filter vessel will be prepared by spreading a small bundle of excelsior on the sand surface. This is to avoid penetration of the top layer of sand by the slurry stream.

6.9 The truck will be positioned at the filter vessel and the motor turned off.

6.10 The end of the discharge hose will be placed in the filter, and the valve on the bottom of the tank will be opened.

6.11 The residual vacuum in the tank will be bled off by opening the valve on top of the tank.

6.12 When the vacuum has been bled off, the inspection port on top of the tank may be opened.

6.13 After all the waste has drained from the tank, the inside of the tank and the discharge hose will be washed with water using the water hose at the filter vessel. Rags or Kimwipes will be used to clean explosives off the inspection port cover. These rags or Kimwipes will then be placed in the filter for disposal. The inspection port on top of the tank will be closed.

6.14 Any wet machining waste that has been packaged in accordance with ESA SOP 12.1.2 will be emptied into the filter vessel. The bags and cardboard boxes will be placed on Flash Pad 387 and burned with other combustible waste.

6.15 The Disposal Unit Supervisor will inspect the filter vessel to determine whether it will hold another load.

6.16 When the filter is full, the wet waste will be distributed to a uniform thickness, not to exceed approximately three inches, by using a spark-proof rake. The filter vessel will never be raked after the drying period has been started.

6.17 The truck will be driven to Building TA-16-400, and the outside of the tank and the truck will be washed as needed per ESA Operating Standard 18.1.1, "Explosives Decontamination", Section 10.

7.0. DRYING PROCEDURE

7.1 The filter vessel cover will be lifted from the cover platform, placed on the filter, and secured. To perform this operation, two operators will be required.

7.2 The hot air valve leading to the filter vessel that is to be dried will be opened. The other valve will be closed.

7.3. The switch that records the temperature of the air entering the filter vessel to be dried will be turned on.

7.4 The temperature recorder will be turned on.

7.5 The Disposal Unit Supervisor will then start Air Heater 402, and perform the following sequential steps:

7.5.1 The main switch will be turned on.

7.5.2 The heater and blower switches will be turned on.

7.5.3 The selector switch hot air system will be turned on.

7.5.4 If the blower or the heaters are not operating, the heater temperature limit switches will be reset.

7.5.5 If this does not turn on the blower and heaters, the main switch will be turned off and the Materials Section Leader will be called.

NOTE: The door to the heater control panel will be closed and locked at all times except when the controls are actually being manipulated.

7.6 After the waste in the filter vessel has dried, the Disposal Unit Supervisor will turn off Air Heater 402. The cover will be lifted from the filter vessel and placed on the cover platform. The Disposal Unit Supervisor will examine the explosive to determine whether it is dry enough to burn. If not, Items 7.1 through 7.5, above, will be repeated.

7.7 The temperature recorder will be turned off.

7.8 Burning of the explosives will be in accordance with ESA SOP 12.5.1.

7.9 After 24 hours have passed, the Disposal Unit Supervisor will examine the pressure filter to determine the degree of completion of the burn. Before inspection he will first ground the firing circuit at the terminal box located near the filter vessel.

7.10 If burning has not been complete and more than 10 pounds of explosive residues are present, 50 pounds of flake TNT will be poured on and around the unburned material and the material will be burned again. ESA SOP 12.5.1 will be followed in the reburning operation.

7.11 If burning has been incomplete and 10 pounds or less of explosive residues are present, the material may be wet thoroughly with tap water, carefully moved to one side of the filter vessel and included in the next filter vessel burn.

7.12 Ashes and a small amount of sand will be removed from the filter vessel after it has been determined that the latest burning has been complete and no unburned explosives remain. The ashes will be disposed of in accordance with ESA SOP 12.1.0, paragraph 6.18.1. The surface of the filter vessel will then be prepared for the next burn by covering it with an application of fresh, clean sand, a supply of which exists at the filter.

APPENDIX G

Standard Operating Procedure
for
Disposal of HE Contaminated Solvents and Oils

DISPOSAL OF HE-CONTAMINATED SOLVENTS AND OILS

Page 1, Revision 8
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Page 3, Revision 9
Page 4, Revision 5
Page 5, Revision 5

APPROVED M. J. Barr DATE 10-28-87
M. J. Barr, Unit Supervisor

APPROVED R. A. Hildner DATE 10-28-87
R. A. Hildner, Section Leader, WX-3

APPROVED J. L. Parkinson DATE 10/29/87
J. L. Parkinson, Group Leader, WX-3

APPROVED W. A. Bradley DATE 11/2/87
W. A. Bradley, Asst. Division Leader, WX

APPROVED NOT REQUIRED DATE
A. M. Valentine, Group Leader, HSE-1

APPROVED W. C. Courtright DATE 9/27/88
W. C. Courtright, Group Leader, HSE-3
RMG 12/23

WX-3

STANDARD OPERATING PROCEDURE

FOR

DISPOSAL OF HE -CONTAMINATED SOLVENTS AND OILS

Prepared By: _____ Date _____

Approved By: _____ Date _____
D. A. Hemphill, Section Leader, WX-3

Approved By: _____ Date _____
L. A. Stretz, Group Leader, WX-3

Approved By: _____ Date _____
W. A. Bradley, Division Operations Coordinator, WX-DO

Approved By: _____ Date _____
P. D. Whitehead, Safety Officer, HS-5

Approved By: _____ Date _____
N. L. Shalkowski, X-ray Device Control Office, HS-12

1.0 SCOPE

This SOP governs the burning of HE-contaminated solvents and oils at the Group WX-3 burning ground.

2.0 LOCATION

Burning Pit TA-16-394; TA-16-387; Control Shelter TA-16-389; gate, Structure TA-16-349; and Building TA-16-400.

3.0 LIMITS

3.1 Personnel

3.1.1 Four at Burning Pit 394
3.1.2 Five at Control Shelter 389

3.2 Explosives

The quantity of HE-contaminated solvents and oils will not exceed 250 gallons in a single burning operation.

4.0 EQUIPMENT

4.1 Burning ground firing circuit (ENG-C-23444)
4.2 Periscope (13Y-47593 D-1 through D-5)
4.3 Blasting machine (US Army, 10 cap-capacity) White-Rodgers Electric Company, Type 6901, Number 1
4.4 Burning ground trays (13Y-102275 D-1)
4.5 Boom truck
4.6 Drum hook (SK 7571 C-1)
4.7 Drum discharge plug, valve, and hose
4.8 Drum tilt stands
4.9 Flexible grounding straps
4.10 Vacuum tank (PN 213459)

5.0 MATERIALS

5.1 Squibs (S-94), WX-3 Code Number 225-03, or other similar DuPont S-series squibs
5.2 Excelsior
5.3 Kerosene
5.4 Kindling wood and scrap lumber

6.0 PROTECTIVE APPAREL

In addition to issued apparel, respirators must be worn when volatile solvents are to be discharged for burning. Face shields or other suitable eye protection are to be worn during those periods when liquid is discharged and during cleanup operations when airborne particles constitute an eye hazard.

7.0 MATERIALS HANDLING

Five-gallon cans and other containers that weigh 50 pounds or less may be moved by individual operators. Containers that weigh from 50 to 100 pounds may be moved by two operators provided the load is equally distributed. The 55-gallon drums and containers that weigh more than 100 pounds must be handled by the boom truck equipment.

8.0 AREA CLEARANCES

8.1 When the Disposal Crew Leader has determined that a burning area has been satisfactorily loaded and is ready to be burned, a check of the burning ground will be made. Personnel that are to remain during the burning operation will assemble in the control shelter. All others will leave the area. An operator will check to make sure that the gate (Structure 349) on the access road is closed. If it is open, he will notify the Disposal Crew Leader and another check of the area will be made before the burning operation continues. If it is closed, the operator will return to the control shelter.

8.2 All motor vehicles at the burning ground will be parked at Control Shelter 389 and their radios will be turned off.

8.3 The Disposal Crew Leader will check the radio located in the control shelter and make sure that it is turned off.

9.0 PROCEDURE

9.1 Preparations

9.1.1 When HE-contaminated liquids are delivered to the burning ground in five-gallon cans, the truck will be backed into the entrance of Burning Pit 394 and the motor turned off. After the contaminated liquids have been unloaded, the truck will be driven to Control Shelter 389, parked, and the motor turned off, or it will be driven away from the burning ground area.

9.1.2 When HE-contaminated liquids are delivered to the burning ground in 55-gallon drums, the truck will be backed into the entrance of Burning Pit 394, and the truck boom will be used to unload and position the drums on tilt stands on the burning ground pit. After the drums have been unloaded, the truck will be driven at least 50 ft from the pit and the motor turned off.

9.1.3 When HE-contaminated liquids are delivered to the burning ground in the vacuum tank (PN 213459) mounted on a truck, the truck will be backed into the entrance of Burning Pit 394. The contaminated liquids will be drained from the tank into the trays by using a discharge hose. The inside of the vacuum tank will be cleaned with water and detergent after draining liquids into the pans.

9.1.4 After the delivery truck has left the pit, the disposal personnel will begin the disposal operation. For flammable liquids, it will not be necessary to use any wood to assist the burning. For nonflammable liquids, kindling wood or scrap lumber will be placed around the trays. Care will be taken to ensure that the trays are level. The amount of

wood to be used will be determined by the type and quantity of HE-contaminated liquids to be burned. Contaminated solvents, if available, may be mixed with moderately flammable oils to promote burning.

9.1.5 The HE-contaminated liquids will be poured into the trays from the 5-gallon containers by hand. A grounding strap will be attached to the 5-gallon container and the tray being filled.

9.1.6 The HE-contaminated liquids will be discharged into the trays from 55-gallon drums with the plastic plug, valve, and hose provided for this purpose. Grounding straps will be attached to the 55-gallon drum and the trays being filled.

9.1.7 The empty containers and discharge equipment will be loaded on the delivery truck and taken to Pit 386.

10.0 BURNING PROCEDURES

The burning of HE-contaminated liquids will be done in accordance with WX-3 SOP 12.5.1.

11.0 CLEANUP

11.1 On the first workday after the burning operation, the Disposal Crew Leader will inspect the trays to determine whether all liquid has been burned or flashed and all HE has been burned. If he is not satisfied that the burning is complete, he may repeat the appropriate steps of this SOP and WX-3 SOP 12.5.1 to ensure complete burning of the material. It is permissible to leave unburned oil in the trays (covered) until additional burnable fluids become available.

11.2 Equipment used to charge Burning Pit 394 with fluids to be burned will be thoroughly cleaned at Building 400. The equipment may be returned to the burning ground for storage.

11.3 A record of all HE-contaminated liquid disposal operations will be kept on Form WX-3-70.

APPENDIX H

Standard Operating Procedure for Operation of the Wastewater ~~Experimental~~ Treatment Facility TA-16-363~~228~~

ESA

STANDARD OPERATING PROCEDURE

FOR

OPERATION OF THE WASTEWATER TREATMENT FACILITY

TA-16-363

Prepared By:_____**Date**_____
C. W. Sandoval, ESA-WMM

Approved By:_____**Date**_____
D. A. Hemphill, Team Leader,
Materials Section, ESA-WMM

Approved By:_____**Date**_____
L. A. Stretz, Group Leader, ESA-WMM

Approved By:_____**Date**_____
Roger Goldie, Safety Officer, ESA-FM/ESH-5

Los Alamos
National Laboratory

CONTROLLED DOCUMENT

Users have the ultimate responsibility to ensure that
they are working with the latest revision of the controlled document.

1.0 SCOPE

The Wastewater Treatment Facility (WWTF) is designed to reduce the level of organic compounds being released to the environment by passing wastewater through activated charcoal filters. As presently designed the charcoal within the filters is selected and sized to remove much of the volatile and other short chain hydrocarbons from wastewater. The facility is designed to operate as an independent system requiring no manpower other than an occasional check of flow meters, effluent quality Chemical Oxygen Demand (COD), Hydrogen Potential (pH) tests, and system integrity (leaks, corrosion, building condition, heater operation, etc.). This SOP will address ESA responsibilities associated with the operation of the WWTF at TA-16-363.

2.0 LOCATION

TA-16 Burn Ground

TA-16-401 and -406, two filter vessels connected by buried pipes directly to the WWTF.

3.0 EQUIPMENT

Figure 1. Schematic of the WWTF which illustrates the operating equipment.

Carbon changeout equipment includes: 55-gallon drums, buckets, gloves, and full face respirators (as appropriate), carbon charging hopper/pump unit, spent carbon collection/filter unit.

4.0 LIMITS

4.1 Explosives

The filtered waste water does not contain significant quantities of explosives. It would not be appropriate to set a limit for normal operations. However, the activated charcoal can absorb as much as 30% of contaminants, by weight, which may include HE. In view of this, a building limit of 400 pounds HE is established. This is based on four (4) operating filters containing a maximum of 100 lbs. contaminant load each.

4.2 Personnel

Five (5) people at the WWTF

5.0 HAZARDS

WWTF presents no hazards during operation; however, operators may be exposed to sump fluids containing HE residual material and possibly some organic solvent vapors when replacing activated carbon.

6.0 CONTROLS

Gloves should be worn and care taken not to spill fluids or carbon during changeout. If odors are strong, a full face respirator with organic vapor canisters will be worn. Employees wearing respiratory protection must have current approval and wear only assigned protection. Any spillage may be picked up with scrapers and/or rags. Contaminated scrapers or rags will be disposed of by burning on burn trays or the flash pad.

7.0 OPERATING PROCEDURES

7.1 Building settling tank sumps will be cleaned according to Standard Procedures outlined in ESA SOP 12.1.4.

7.2 Visually confirm there is power to the facility before emptying the sump truck into a filter vessel. This confirmation may involve observing lights at the facility entrance (if available) or by entering the facility to assure the power switch is on.

7.3 The main tank capacity is 1000 gallons and the facility is designed to treat and discharge a 750 gallon load in about 30 minutes. This input flow rate of 25 gallons/minute should not be exceeded. An optimum flow rate of 6 gallons/minute has been determined and should be maintained whenever possible. When significant quantities of liquid are to be treated, the flow from the sump truck will be controlled to minimize the possibility of main tank overflow.

7.4 Any building sump known to contain soluble barium will be treated per ESA SOP 12.2.0 before those sump fluids are emptied into a filter vessel.

7.5 Figure 1, shows a schematic of the WWTF. The system will normally run with sump fluids pumped through a 30μm pre-filter, then to two 10μm particle filters (in parallel) and then through two activated carbon canisters (in series). This is followed by a 30μm post filter and pH monitoring/adjustment step. Following are guidelines for filter/canister operation:

7.5.1 When the pressure gauge at the 10μm parallel filters registers 14 psi or greater, or flow meters indicate that flow is restricted to 2 gal/min or less, filters should be checked and changed if necessary.

7.5.2 The maximum flow rate through the carbon absorption units is about 25 gallons/minute through each flow meter with an optimum of 6 gallons/minute. When new fine-particle filter cartridges are installed, the flow meter valves will have to be adjusted to restrict flow to this level.

7.5.3 Samples of fluid will be taken at input (from the 1000-gallon tank #1), midstream (from valve between two carbon units in series) and at output (from the exterior retaining tank) for every sump truck load. These process control samples will be analyzed for COD and pH by HE Science & Technology personnel. Data obtained shall be reported to the Disposal Unit Supervisor. The activated carbon will be replaced if the COD continually exceeds 75-100 mg/liter (75-100 ppm).

7.5.4 Skin contact with liquids should be washed off immediately with soap and water.

7.5.5 Two baseboard heaters within the facility will be set to maintain a temperature of 40°F minimum. Proper operation of the heater should be monitored especially during winter to minimize the possibility of freezing.

7.6 Removal of Spent Carbon

7.6.1 Attach a filter bag to the collection frame and place the frame in the manhole above the input tank.

7.6.2 Disconnect input and output lines

7.6.3 Direct output hose into the filter bag on the collection frame.

7.6.4 Direct a stream of water into the input port on the absorption unit. The carbon will discharge as a slurry into the filter bag.

7.6.5 After the water has drained from the carbon, use a forklift to lift he collection frame from the manhole and remove the carbon to barrels for disposal.

7.7 Recharging Carbon into Absorption Unit

7.7.1 Fill hopper of charging unit with carbon and wet thoroughly with water

7.7.2 Fill absorption unit with water

7.7.3 Place carbon fill line into absorption unit filling port

7.7.4 Place water line (attached to pump) into the treated water outlet port of the carbon absorption unit well below water level.

7.7.5 Open valves; water to pump and carbon hopper to eductor.

7.7.6 Turn on pump. Water and carbon will mix in the eductor and be transferred as a slurry to the absorption unit.

7.7.7 When transfer is complete, turn off pump and open drain valve.

8.0 COMPLIANCE SAMPLING

Periodic sampling is performed by ESH Division to ensure compliance with the NPDES permit for Outfall 055. At the outfall, flow rate is checked and grab samples are taken and tested for COD and pH. If no treated water is ready for discharge when ESH wants to sample, burn ground operators should call to inform them the next time water is ready to release to the outfall.

9.0 EMERGENCY WARNINGS/PROCEDURES

9.1 Flashing red lights on the WWTF building warn of potential problems. The top left light indicates that the 1000 gallon input tank is near overflow. The bottom left light flashes if water is detected in the input tank secondary containment. This means that the primary tank is compromised or overflowing. Flashing red light on the top right indicates approaching overflow of the 3000 gallon post-treatment retention tank. The lower right lights if water is detected in the post-treatment tank secondary containment.

9.2 Notify the ESA Disposal Unit Supervisor for any emergency (pump noise, serious leaks, etc.).

9.3 To confirm five-particle filter saturation, the disposal supervisor should briefly open the emergency valve located just below the flow meters. If flow increases the filters are saturated, if flow does not increase the main pump (input tank) may need servicing.

Figure 1. Schematic of WWTF

OPERATION OF THE EXPERIMENTAL TREATMENT FACILITY TA-16-228

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Page 6, Revision 0

SUBMITTED M. J. Barr DATE 11-13-89
M. J. Barr

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APPROVED J. L. Parkinson DATE 11/17/89
J. L. Parkinson, Group Leader, WX-3

APPROVED Wm. A. Bradley DATE 11/22/89
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APPROVED A. M. Valentine DATE 12/19/89
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APPROVED Jack L. Bacastow for H. H. H. DATE 1/19/90
H. H. HOWARD, Group Leader, HSE-3
RHG 1/17

APPENDIX I

Standard Operating Procedure for Loading Pits with Dry Explosive Scrap

LOADING PITS WITH DRY EXPLOSIVE SCRAP

I. LOCATION

Burning Pits TA-16-388 and 399; Control Shelter TA-16-389; and gate, Structure TA-16-349.

II. EQUIPMENT

A. Felt (asphalt-saturated), 15-pound weight

B. Spark-proof knives

III. LIMITS

A. Explosives

1000 pounds per pit

B. Personnel

1. Four at Burning Pits 388 and 399

2. Five at Control Shelter 389

IV. PROCEDURE

A. Granular, Powdered, Pressed, and Cast Explosives

1. When scrap explosives are delivered to the burning ground, the Disposal Crew Leader will designate the burning pit to be used. The truck will be backed into the entrance to the pit for off-loading. The explosives loaded floor trucks or boxes will be unloaded just inside the entrance gates. The truck will then be driven outside the fenced area, parked, and the motor turned off.

2. A check of the burning ground will be made to make sure that all unauthorized personnel leave the burning ground and the gate, Structure 349, is closed.

* 3. The Disposal Crew Leader will determine the exact positioning of the explosives. A sufficient amount of felt will be unrolled and placed on the sand surface of the burn tray at least 10 feet from the explosives that were unloaded from the truck. A container of explosives will be placed on the felt, opened, and emptied. The explosives will not be tumbled out onto the ground or tray by up-ending the container. Each piece of explosive will be handled carefully and placed approximately two inches from the adjacent pieces in a single layer. After the containers have been emptied, they will be placed beside or on top of the explosives for

*INDICATES CHANGE

IV. A. 3. (cont.)

burning, or returned to the truck for transporting away from the burning ground. They may be burned in Pit TA-16-387 at a later date.

* 4. Cast or pressed pieces that weigh more than 55 pounds (25 kilograms) will follow Group WX-3 SOP 12.3.5.

5. After the first container has been emptied, another will be opened and the above steps repeated. This operation will continue without interruption until all the containers have been emptied and their contents spread.

* 6. When granular or powdered explosives are burned, the layer of explosives will not be deeper than three inches on the felt.

* 7. If the scrap material appears to contain anything other than the regular explosives, for example, MDF, detonators, or unidentified materials, it will be placed in one of the containers and set aside until the foreign material or item is properly identified and removed if necessary. If identification cannot be made immediately, the container must be sealed and returned to storage until the foreign material or item can be properly identified and removed if necessary. HE pieces with detonators or squibs attached shall not be burned.

8. After all the containers have been emptied, the empty floor trucks will be loaded on the truck. The truck will be driven to Control Shelter 389, parked, and the motor turned off, or it will be driven away from the burning ground.

9. Burning of the explosives on trays will be done in accordance with WX-3 SOP 12.5.1.

B. Scrap MDF and MDF Test Devices

1. Fifteen pounds of scrap MDF or five scrap MDF test devices may be burned at one time. No other explosives, except flake TNT, may be burned with the MDF. Flake TNT may be added to ensure complete burning. MDF devices containing detonators will not be burned.

* 2. A sufficient amount of felt will be unrolled on the sand surface within the burn tray. A maximum of 25 pounds of flake TNT will be spread on the felt to a depth not exceeding three inches.

IV. B. (cont.)

3. The scrap will be carefully placed on the TNT. Additional TNT (approximately five pounds) may be poured on the MDF or test devices to ensure complete combustion.

* 4. Burning of the explosives on trays will be in accordance with WX-3 SOP 12.5.1.

C. Scrap Extrudable HE

1. Loose pieces of extrudable HE and extrudable HE contained in experimental Extex devices may be burned together. The total amount of extrudable explosives that may be burned at one time is 25 pounds.

* 2. A sufficient amount of felt will be unrolled on the sand surface of the burn trays. A maximum of 85 pounds of flake TNT will be poured over the felt in a uniform depth not to exceed three inches.

* 3. The extrudable scrap will be spread uniformly over the TNT. No other explosives except flake TNT may be burned with extrudable HE.

4. Burning of the explosives on trays will be done in accordance with WX-3 SOP 12.5.1.

D. HE Charges with Booster System

HE charges to which booster systems or MDF arrays are permanently attached will not be disposed of by burning.

E. Burn Frequency

* 1. A minimum of 24 hours must lapse after burning HE before another burn can take place on the same pad. Ashes will be disposed of in accordance with SOP 12.1.0, paragraph VI.R.1 and 2. Ashes from burns must be removed before subsequent burns may be made.

LOADING PITS WITH DRY EXPLOSIVE SCRAP

Page 1, Revision 10
Page 2, Revision 10
Page 3, Revision 12
Page 4, Revision 16

Obsolete: Page 5, Revision 10

APPROVED M. J. Barr DATE 10-28-87
M. J. Barr, Unit Supervisor

APPROVED R. A. Hildner DATE 10-28-87
R. A. Hildner, Section Leader, WX-3

APPROVED J. L. Parkinson DATE 10/29/87
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APPROVED Wm. A. Bradley DATE 11/2/87
W. A. Bradley, Asst. Division Leader, WX

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APPROVED Jack L. Bacastow for W. C. C. DATE 1/7/88
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RHG 12/23

APPENDIX J

Transportation Procedures and Procedures for the Cleaning of HE Transportation Vehicles and Equipment

GENERAL EXPLOSIVES TRANSPORTATION PROCEDURES

I. SCOPE

* This procedure governs the transportation of explosives at S-Site, and the procedures to be followed in the shipping and receiving of explosives. Separate SOP's are written to cover the specific activities of vehicles used primarily for the transportation of explosives, as follows:

13.2.0 - Operation of HE Transportation Vehicles Equipped with Van Body and Hydraulic Tail Gate

13.2.1 - Operation of HE Transportation Vehicle Equipped with Sump Waste Disposal Body and Hydraulic Boom

13.2.2 - Operation of Flatbed HE Transportation Vehicle Equipped with Hydraulic Tail Gate and Removable Stake Sides

* 13.2.3 - Operation of HE Transportation Vehicle Equipped with Hydraulic Crane

* Vehicles operated by Group M-1's Explosives Development Unit and Analytical Laboratory Unit, Group WX-11's Systems Testing Unit, and Group WX-3's Pressing and Disposal Unit for the occasional transportation of explosives are covered by this SOP.

II. LOCATION

Within and between LANL Technical Areas

III. LIMITS

A. Personnel

Personnel limits for specific activities are contained in the SOP's governing those activities. For those activities covered by this SOP, the personnel limit is a driver and one passenger.

B. Explosives

* For those activities covered only by this SOP, and for vehicles operated by Group WX-3's Pressing and Disposal Unit, and Group M-1's Analytical Laboratory Unit, the explosives limit is 0.5 kg.

* Indicates change

III. B. (cont.)

* For the vehicle operated by Group M-1's Explosives Development Unit, the explosives limit is 41.0 kg for uncured extrudable formulations, slurries, or bulk powders, but 0.5 kg for any other explosive items. For the vehicle operated by Group WX-11's Systems Testing Unit for the transportation of test units only between Rest House K-36 and the K-Site Drop Tower, the load limit is 10 kg.

IV. ALLOWABLE EXPLOSIVES
Explosives approved for transport are listed in Tables 1, 2, and 3, and Section IV. D of WX-3 SOP 1.1.0.

V. EQUIPMENT
The equipment utilized in the various HE transportation operations is listed in the specific SOP's above.

VI. HANDLING
Handling operations must be performed in accordance with WX-3 SOP's 14.1.1 through 14.1.5.

VII. DRIVER QUALIFICATIONS
In order to qualify as an operator of transportation equipment assigned or occasionally used to transport HE, an individual must meet the following requirements:

A. Must be assigned to the Group WX-3 Transportation and Material Handling, Assembly, or Pressing and Disposal Units; the Group M-1 Explosives Development or Analytical Laboratory Units; or the Group WX-11 Systems Testing Unit.

B. Must possess a valid New Mexico driver's license of the appropriate class for the size of vehicle being operated.

VIII. DRIVER TRAINING
A. Each driver will be trained in the operation of the specific type of vehicle and its ancillary equipment before being permitted to operate the vehicle. Such training may be administered by the appropriate Supervisor. The Supervisor will certify the operator's skill and proficiency before that person is allowed to transport explosive materials. Additional training will be given, if necessary, when the assignments are changed.

APPROVED

J. L. Parkinson, WX-3	3/22/90 DATE	J. M. Graf, HSE-1	4/24 DATE
W. A. BRADLEY, WX-DO	3/26/90 DATE	R. H. GOLDIE, HSE-3	6/2/90 DATE

VIII. (cont.)

B. Drivers who have been involved in a traffic violation or an accident will be given specific training to avoid particular driver action which caused or contributed to the violation or the accident.

IX. SMOKING

Smoking is not permitted in vehicles used for transporting explosives. Smoking and matches, lighters, or other flame-, fire-, or spark-producing devices will not be permitted within 100 feet of a vehicle during the loading, unloading, or transporting of explosives, except for casual passage.

X. VEHICLE OPERATIONS

A. General

The driver of an HE transportation vehicle shall abide by the following rules of operation and conduct:

1. Explosives may be transported only in a vehicle approved for that purpose.

2. All traffic rules that normally apply to the operation of civilian vehicles shall be obeyed.

3. All traffic regulations, instructions, and control devices shall be obeyed. A vehicle carrying explosives shall not be driven in excess of 35 mph, or the lower posted limits, on any road in Los Alamos County, or in excess of the posted limits for trucks outside of Los Alamos County.

4. The driver is responsible for the vehicle and all associated equipment during the period for which it has been assigned to the driver for operation.

5. The driver shall exhibit a high degree of road courtesy at all times, and shall use only the proper half of the road at all times. All emergency vehicles, such as fire trucks, ambulances, and police cars, while having the right of way over vehicles carrying explosives.

6. The driver shall be constantly alert for situations that are out of the ordinary or uncommon. The appropriate Supervisor is to be notified of such situations and will provide instructions in regard to subsequent actions.

7. The driver will notify appropriate personnel at receiving sites that a delivery is being made and request specific instructions.

X. A. (cont.)

* 8. The driver shall at all times demonstrate favorable actions, behavior, manners, and attitude.

9. The driver shall refuse to pick up HE for which acceptable materials handling equipment is not available. Such matters are to be referred to the appropriate Supervisor for instructions in regard to subsequent actions.

10. The driver shall refuse to pick up any material, other than materials handling equipment from sites outside of S-Site if such a pickup has not been previously authorized. Such authorization shall include instructions regarding handling and a delivery point.

11. The driver shall never back a motor vehicle up to a dock or loading platform while explosives are located on the dock or platform, or while the dock or platform door is open to a room containing explosives.

* 12. The driver is expected to report situations where traffic control signs or markings are illegible or in poor condition to his Supervisor who will request maintenance. Traffic signs, loading zone markings, clearance signs, and other markings are provided to facilitate or ensure safe and secure operations of vehicles within S-Site operating areas.

13. No government vehicle assigned to HE transportation service shall be used to tow or push any other vehicle at any time.

B. <u>Backing</u>

1. The driver shall utilize the utmost caution in backing. If necessary, the driver shall park the vehicle and walk to the rear to check the area for obstructions and clearance.

2. The driver must check the overhead clearance of the area against the effective height of the vehicle and load to make certain of clear entrance into the area.

3. The vehicle shall be backed slowly and cautiously, and side mirrors and any other devices available in guiding the vehicle into place shall be used. A helper, if available, shall assist the driver in the backing operation from a position outside the vehicle. If the vehicle is to be driven into Building TA-16-410 or -411, the provisions of WX-3 SOP 11.3.2 shall be followed.

X. (cont.)

C. PARKING

1. Vehicle brakes shall be set during the parking period.

2. A rear wheel shall be secured with chocks placed fore and aft when a vehicle is parked on significant grade.

3. If the vehicle is to be left unattended or stored, the ignition shall be turned off and the vehicle placed in low (first) or reverse gear (depending on the terrain). Vehicles which have automatic transmissions shall be placed in "park". These actions in no way reduce the requirement for setting the brakes.

D. TWO-WAY RADIOS

* 1. With the exceptions listed below, each HE transportation vehicle shall be equipped with a two-way shortwave radio (KAYD net). These radios shall be operated in accordance with WX-3 SOP 13.4.0.

* Exceptions: Vehicles operated by Group M-1's Analytical Laboratory Unit or Explosives Development Unit, and Group WX-3's Pressing and Disposal Unit.

The boom truck and the vacuum tank truck used by the Disposal crew for the handling of explosives waste during sump clearing operations.

* Pickup trucks used by Group WX-11's Systems Testing Unit for the transportation of test units only between Rest House K-36 and the K-Site Drop Tower.

2. The ability to communicate by radio shall be maintained at all times. Any malfunction of the radio communication equipment shall be reported to the appropriate Supervisor immediately. Radios should not be taken out of service unless it is necessary in order to observe radio silence for safety or security reasons.

3. Radios shall be turned off at all times while the transmitter is within 200 feet of exposed blasting caps or in areas suspected of containing exposed blasting caps.

XI. CARGO HANDLING AND MOVEMENT

A. 1. Explosives being transported shall be carried in WX- or Department of Transportation (DOT)-approved HE transportation containers.

* 2. HE transportation vehicles shall display hazardous material placards as required by 49 CFR 100-200 whenever they are transporting explosives either inside or outside of the Explosives Area. Red flags, at least 12x12 in., shall be displayed on each corner of the vehicle whenever explosives placards are displayed when the vehicle is on a public highway.

* 3. HE transportation vehicles shall be equipped as follows:

a. Two dry chemical fire extinguishers (minimum 5-pound or equivalent, one inside the driver's compartment and one on the outside of the vehicle.

b. A spark arresting device mounted in the exhaust system. A standard muffler is not an effective spark arresting device, but may be used in conjunction with such a device.

A switch to isolate the battery from the ignition system is advisable for use in the event of fire in the engine compartment or if the vehicle is to be left at any time within the truck slip of Building TA-16-410 (WX-3 SOP 11.3.2 IV.B.7).

4. No person shall be allowed to ride in or on the cargo compartment area of a vehicle that is transporting explosives.

5. Containers of explosives shall not be handled roughly, thrown about, tumbled over the floors or other containers, or dragged or pushed along floors.

6. Miscellaneous cargo, particularly loose metal, shall not be carried along with explosives. Materials handling equipment, such as slings, belts, and straps, shall be carried in a receptacle provided for the purpose or shall otherwise be attached to the vehicle.

7. Before a vehicle is loaded, it shall be checked to be certain that no loose explosives are present. The vehicle shall be checked after unloading to be sure that no loose explosives remain.

XI. (cont.)

B. Deliveries

* 1. Pickup or delivery of explosives from or to any building shall be made only at authorized entrances. Authorized entrances are listed in Chart 1.

* 2. The route of a vehicle that is used to transport explosives shall not pass through a congested area. For example, deliveries to or from the Los Alamos airstrip shall be made via East Jemez Road, State Route 4, and back up East Road.

3. The lids of containers shall be in place and properly secured at all times while explosives are being transported.

4. Vehicles loaded with explosives shall not be left unattended, with the following exceptions:

* a. Vehicles loaded for early morning delivery or that have arrived late in the work day may be left parked overnight in the Building TA-16-410 truck slip (see WX-3 SOP 11.3.2 IV.B.7), in Building TA-16-400, or inside the fence, near the gate, at TA-37.

b. When loading or unloading is incomplete at the end of the work day, cargo trailers servicing Buildings TA-16-360 and -380 or Magazines TA-37-3 through 26 and TA-28-1 through 5 may be left parked in front of the building being serviced in a partially loaded condition until loading and unloading can be resumed, subject to the following conditions:

(1) The load shall be unclassified.

(2) The load shall be stable and the doors of the trailer locked.

(3) The trailer shall be well braked and the wheels chocked.

(4) The explosives load in the trailer plus the explosives load within the building shall not exceed the posted explosives load limit for the building.

(5) The trailer shall be placarded as required for transportation on a public highway by 49 CFR 100-200.

XI. B. 4. b. (cont.)

(6) The cargo trailer shall not be attached to the tractor. If the trailer is still attached to the tractor or if the vehicle is made in such a way that the engine, cab, and cargo compartment share the same chassis, then it shall not be left parked overnight in a loaded or partially unloaded condition in these areas.

c. If the vehicle has the tractor attached to the trailer or if the vehicle is made in a way that the engine, cab, and cargo compartments share the same chassis, it may be parked inside the fence, near the gate, at TA-37 until loading or unloading operations can be resumed or until it can be moved for other reasons. Vehicles containing explosives parked in the area are subject to the same conditions as stated in XI.B.4.b (1), (2), (3), and (5), above.

C. Squibs and Detonators

1. Incoming shipments of squibs of relatively low threshold energy may be brought into the Explosives Area in DOT-approved containers. These containers shall suffice for storage in the WX-3 magazines. Upon withdrawal of any quantity of such devices for magazine storage for delivery to any other area, the devices shall be transported, carried, and stored in the DOT-approved container or an approved WX-3 container except when being prepared for use as a part of a firing device, or at a test site, or at the burning ground.

2. Detonators listed in WX-3 SOP 1.1.0, Table 3, may be carried in the same vehicle with other types of explosives in both intrasite and intersite transportation, provided that they are carried in containers certified to be nonpropagating. When nonpropagating containers are not used, other types of explosives shall not be carried.

* 3. Explosives that have had approved detonators incorporated into them during their manufacture are not considered to be different from other explosives of the same type.

D. Shipments

1. Route

Vehicles that transport explosives shall enter or leave S-Site only through Gate 101.

XI. D. (cont)

2. Incoming Shipments

a. Incoming common carrier and courier-operated vehicles that are carrying explosives shall be inspected, and their condition approved, by the Transportation and Materials Handling Supervisor, or a designated alternate, before these vehicles are moved into the Explosives Area. The inspections will be done in the Holding Yard near Security Station 502. The Transportation and Materials Handling Supervisor shall release the vehicle by a properly executed DD Form 626.

* b. When an incoming shipment of explosives arrives at Security Station 502, Protective Force personnel shall notify one of the persons listed below that the truck will be entering S-Site through Gate 101.

(1) Transportation and Materials Handling Supervisor
(2) Scheduling Unit Leader
(3) Operations Control Section Leader

An up-to-date list of the persons in these positions and their telephone numbers will be maintained at Security Station 502.

c. The above procedure shall also apply to unloading vehicles entering the area to pick up explosive shipments. Unless otherwise directed by the Transportation and Materials Handling Supervisor, all deliveries are to be made to Building TA-16-360, and all shipments are to be made from Building TA-16-360.

3. Outgoing Shipments from WX-3 - Common Carrier and Courier-Operated Vehicles.

a. Common carrier and courier-operated vehicles that are scheduled to be loaded with explosives for outgoing shipments shall be inspected and released by a properly executed DD Form 626 before the shipment is loaded. The form shall be executed by the Transportation and Materials Handling Supervisor or his designated alternate, as in Section XI.D.2.a, above. A single DD Form 626 may be used by the inspector to indicate acceptance of a vehicle for both an incoming shipment and outgoing shipment; in this case, the DD Form 626 will be so marked.

XI. D. 3. (cont.)

b. Before such a vehicle is released, the load shall be stabilized by board and nail cribbing, banding, and/or strapping so that the load may not shift in horizontal or vertical directions during transport. The following rules shall be observed during such stabilization processes:

(1) The personnel limit for common carrier vehicles near the building or magazine where the HE is withdrawn, loaded into the vehicle, containers unitized, and load stabilized, is seven (see WX-3 SOP 15.2.0).

* The personnel limit for courier-operated vehicles, for loading or unloading explosive assemblies at Building TA-16-410, is twelve.

(2) HE container utilization and load stabilization activities shall take place in the vehicle cargo compartment, never in the building.

(3) HE containers shall be loaded into the cargo compartment by WX-3 personnel.

(4) HE containers shall be placed in the vehicle cargo compartment in a configuration selected by representatives of the WX-3 Operations Control Section.

4. Outgoing shipments from WX-3/MAT-4 vehicles

HE containers being transported by MAT-4 shall be loaded and stabilized as directed by MAT-4 personnel.

E. Temporary Parking of Vehicles Containing Outbound Explosives Shipments.

Outbound vehicles loaded or partially loaded with unclassified explosives shipments may be parked inside the fence of TA-37 until pick up can be made. Classified shipments may be parked in the truck slip of Building TA-16-410 or inside the fence near Security Station 565 until the movement from S-Site is made.

XII. OPERATING UNDER ABNORMAL CONDITIONS

A. Electrical Storms

In the event of a severe electrical disturbance in an operating area, the driver of an HE transportation vehicle shall follow the sequence of steps listed below.

XII. A. (cont.)

1. The vehicle shall be driven away from any inhabited buildings, operating buildings, or magazines, so that at least 300 feet separate the vehicle from the structures.

2. The vehicle shall be stopped on the shoulder of the road.

3. The engine should be kept running and the windows partially open for ventilation.

4. The radio shall be kept in operation.

5. All vehicle lights shall be turned on.

6. All blinker systems, such as turn signals, shall be actuated. The emergency signal shall be used if possible. If such a device is not available, the turn signal nearest the road should be used.

7. The appropriate Supervisor shall be informed by radio of the vehicle's location and condition.

8. Personnel shall remain with the vehicle until the electrical disturbance is over, or orders for a further specific course of action are received.

B. Impaired Visibility

In the event of bad weather or other conditions that curtail visibility to a dangerous extent, the driver of an HE transportation vehicle shall follow the sequence of steps listed below.

1. The vehicle shall be parked on the shoulder of the road.

2. The engine should be running and the windows partially open for ventilation.

3. The radio shall be kept in operation.

4. All vehicle lights shall be turned on.

5. The emergency flasher shall be actuated.

6. The appropriate Supervisor shall be informed by radio of the vehicle's location and condition, and the reasons for stopping the vehicle.

7. Personnel shall remain with the vehicle until conditions have improved so that adequate visibility is regained, or orders for further specific course of action are received.

XII. (cont.)

C. Unscheduled Shutdown

In the event of an unscheduled shutdown of WX-3 transportation activities, the following procedures shall be observed:

1. The appropriate Supervisor shall be contacted for instructions.

2. The Supervisor shall direct the truck to proceed to some specific destination depending on the load involved.

3. The Supervisor shall outline the specific procedure to be followed.

4. Trucks need not be unloaded before proceeding to a safe place.

* 5. If the shutdown is one involving a national emergency, radio instructions should be as short as possible in order to put as little traffic as possible on the S-Site radio network.

D. Emergency Situations

Emergency procedures separate from these SOP's have been written to provide guidance to personnel in case of an accident, fire, or other emergency situation, particularly while they are on a public highway. These emergency procedures have the same official status as an SOP and will be reviewed annually by all personnel.

XIII. MAINTENANCE AND REPAIR

A. Vehicle maintenance shall be requested by the appropriate Unit Leader or by the Transportation and Materials Handling Supervisor.

* B. A vehicle shall be certified clean of explosives by the Authorized Certifying Agent before undergoing maintenance work other than lubrication (WX-3 SOP 13.4.0).

C. HE transportation vehicles will be cleaned by Pan Am personnel when one or more of the following conditions apply:

1. The vehicle is to be sent to the Pan Am shops for maintenance

2. The vehicle is being reassigned or sent to surplus

3. A request for cleaning is made by LANL personnel. A request to have a vehicle cleaned may be made because of specific HE contamination or because, as the result of general use, the vehicle needs cleaning.

XIII.C. (cont.)

In the event the Pan Am personnel cannot do the cleaning, it may be done by qualified WX-3 personnel. Cleaning facilities, in order of preference, are listed below.

1. Cold water

2. Steam/water mixture

3. Vacuum cleaner - to be used in accordance with WX-3 SOP 1.11.2

D. The driver of any vehicle assigned to HE transportation shall make an inspection of the general operating condition of his vehicle before using it. The inspection, which is required at least once a day if the vehicle is used daily, shall include the following items:

1. Lights
2. Brakes
3. Tires
4. Horn
5. Windshield wipers
6. Windshield and windows
7. Steering
8. Tail gate platform, control, and hydraulic and mechanical system (if applicable)
9. Cab and chassis
10. Load compartments
11. Fuel tank and lines
12. Emergency relector roadside kit
13. Seals on fire extinguishers
14. A check for gasoline, oil, water, or hydraulic fluid leaks
15. Exhaust system

Any failure in the operation of equipment or faulty condition of any part of the vehicle shall be reported immediately to the appropriate Supervisor for necessary action.

* E. Safety checks of vehicles used primarily for the transportation of explosives and covered by this SOP shall be made by Pan Am personnel monthly. A list of specific vehicles will be provided by Pan Am separately. Anything that requires repair or adjustment will be repaired before the vehcile is returned to service. The schedule for the various types of vehicles in use at S-Site will be found in the specific SOP relating to that type of vehicle.

CHART 1

AUTHORIZED BUILDING ENTRANCES FOR MOVEMENT OF EXPLOSIVES

TA-8-23		
TA-11-14, south end	TA-16-301	TA-16-410, Doors 1 and 8
TA-11-30	*TA-16-302, Door 5 and 6	TA-16-411, Doors 43 and 44
TA-11-36	TA-16-303	TA-16-413
	TA-16-305	TA-16-415
TA-16-58	TA-16-307, Door 5	
TA-16-73	TA-16-308	TA-16-435
		TA-16-437
TA-16-220	TA-16-340, Door 3 and 20	TA-16-460, Door 1
TA-16-221	TA-16-341	TA-16-463
TA-16-223	TA-16-343	
TA-16-225	TA-16-345	TA-16-477
TA-16-261	TA-16-360, Door 4	TA-18-1, 2, 3, 4, and 5
TA-16-263	TA-16-360, Door 5	
TA-16-265		TA-37-2, Both doors
TA-16-267	TA-16-380, Door 1	TA-37-3 through TA-37-26
	TA-16-380, Door 2	
TA-16-281	TA-16-380, Door 3	
TA-16-283	TA-16-380, Door 4	
TA-16-285		

Notes:

1. Deliveries to Groups other than WX-3 shall be made at building entrances or locations designated by authorized personnel from the appropriate Group.

2. Only the building number is stated if only one door opens into the building from the outside.

3. Building TA-16-340, Door 20, and Building TA-16-460, Door 1, shall be used for moving HE analytical samples not to exceed 100 g.

GENERAL EXPLOSIVES TRANSPORTATION PROCEDURES

Page 1, Revision 13	Page 9, Revision 6
Page 2, Revision 1Ø	Page 1Ø, Revision 8
Page 3, Revision 6	Page 11, Revision 9
Page 4, Revision 8	Page 12, Revision 8
Page 5, Revision 8	Page 13, Revision 6
Page 6, Revision 11	Page 14, Revision 8
Page 7, Revision 11	Page 15, Revision 7
Page 8, Revision 1Ø	Page 16, Revision Ø (obsolete)

APPROVED H. F. Martinez DATE 9/9/87
H. F. Martinez, Transportation Supervisor

APPROVED R. E. Rowan DATE 9/9/87
R. E. Rowan, Section Leader, WX-3

APPROVED J. L. Parkinson DATE 9/11/87
J. L. Parkinson, Group Leader, WX-3

APPROVED Wm. A. Bradley DATE 9/15/87
W. A. Bradley, Asst. Division Leader, WX

APPROVED Not Required DATE
A. M. Valentine, Group Leader, HSE-1

APPROVED Jack L. Bacastow for W. C. C. DATE 11/16/87
W. C. Courtright, Group Leader, HSE-3
RHG 11/13

* CLEANING HE TRANSPORTATION VEHICLES AND HE CONTAMINATED EQUIPMENT BEFORE ON-SITE OR OFF-SITE MAINTENANCE ACTIVITIES

I. SCOPE

* This SOP governs the cleaning of HE transportation vehicles and HE contaminated equipment before maintenance activities.

II. LOCATION

Building TA-16-400

III. LIMITS

A. Personnel

* No more than three in the immediate vicinity while cleaning with steam or hot water; otherwise no limits are imposed.

B. Explosives

* This is not a process building and any HE is from contamination only or from residue machining chips, no limit is appropriate.

IV. EQUIPMENT

A. Building 400 utilities

B. Hoses, brooms, and squeegees

V. PROTECTIVE APPAREL

In addition to issued apparel, the following items should be worn by personnel using steam and hot water or pressurized air for cleaning vehicles:

A. Leather palm gloves

B. Face shields (CM-3270) or goggles (CM-3102)

C. Rubber aprons

*Indicates Change

VI. *CLEANING PROCEDURE - VEHICLES

A. Preparation

1. WX-3 personnel shall remove all loose hardware used in conjunction with the vehicle.

2. WX-3 personnel shall remove all visible contamination from the vehicle cab and load compartment. This may be done with an approved vacuum cleaner (see WX-3 SOP 1.11.2).

3. WX-3 personnel shall park the vehicle at Building 400 or in the parking lot behind Building TA-16-195.

4. WX-3 personnel shall notify the service station attendant or the mechanic at the S-Site PanAm garage that the vehicle is ready for cleaning. The keys shall be left in the ignition switch.

B. Cleaning

* 1. PanAm or LANL personnel shall drive the vehicle into one of the stalls at Building 400.

* 2. The load compartment (and cab if needed) shall be cleaned thoroughly with either cold water or steam and water mixture. Oil and grease accumulation shall not be removed from the hydraulic system, transmission, or any other place using steam or hot water. Accumulation may be removed using solvent and rags if necessary. Soiled rags will be placed in an appropriate metal container.

* 3. After cleaning, the vehicle shall be moved to the parking lot near Building 195 and WX Authorized Certifying Agent notified that the vehicle is ready to be certified clean of HE contamination for the intended maintenance activity. If certification is denied, then the cleaning operation shall be repeated until certification is obtained.

4. After certification is obtained, the vehicle must not be moved back into the WX-3 Explosives Area, as this will cause it to be considered contaminated again.

VII. CLEANING PROCEDURE - EQUIPMENT*

* A. Preparation

* 1. Any equipment used to process HE shall be cleaned as well as possible in the process building before being moved to building 400 for disassembly.

* 2. The WX Authorized Certifying Agent will certify exposed surfaces to be free of HE before transfer to building 400.

VII. A. (cont.)

* 3. Within building 400 the equipment shall be disassembled to the extent necessary to guarantee no pockets or closed areas containing HE remain. Disassembly shall be reviewed by the responsible engineer or supervisor.

* B. Cleaning

* 1. All parts or subassemblies shall be thoroughly cleaned. The responsible engineer or supervisor will review cleaning and identify parts/areas to be protected with rust inhibitor or other protective fluids.

* 2. The WX Authorized Certifying Agent will certify any parts or subassemblies that will be repaired or shipped for repair to be free of HE. The certifying agent may recommend further disassembly if necessary.

* 3. After certification, protective fluids (oil, grease, rust inhibitor, etc.) may be applied before transfer to the repair facility.

VIII. Cleanup

* After a vehicle or equipment has been cleaned, the operator shall clean up the work area as follows:

1. Wash down floor with steam/water mixture.
2. Flush gutters into the sump.
3. Replace special protective apparel, brooms, mops, and squeegees in their respective storage places.
4. Rewind hoses on reels.
5. Close all doors before leaving the area.

CLEANING HE TRANSPORTATION VEHICLES AND HE CONTAMINATED
EQUIPMENT BEFORE ON-SITE OR OFF-SITE MAINTENANCE ACTIVITIES

Page 1, Revision 3
Page 2, Revision 3
Page 3, Revision 3
Page 4, Revision 1

SUBMITTED M. J. Barr DATE 11-23-87
M. J. Barr, Unit Supervisor

APPROVED R. A. Hildner DATE 11-23-87
R. A. Hildner, Section Leader, WX-3

APPROVED J. L. Parkinson DATE 11/30/87
J. L. Parkinson, Group Leader, WX-3

APPROVED W. A. Bradley DATE 12/9/87
W. A. Bradley, Asst. Division Leader, WX

APPROVED NOT REQUIRED DATE
A. M. Valentine, Group Leader, HSE-1

APPROVED Jack L. Bacastow for W. C. C. DATE 1/27/88
W. C. Courtright, Group Leader, HSE-3
RHG 1/26

OPERATION OF HE TRANSPORTATION VEHICLE EQUIPPED WITH SUMP WASTE DISPOSAL BODY AND HYDRAULIC BOOM

The following pages of Group GMX-3 SOP 13.1.2 are now obsolete, and should be removed from the manual:

Page 1, Page Revision 1
Page 2, Page Revision 1
Page 3, Page Revision 1
Page 4, Page Revision 1
Page 5, Page Revision 1
Page 6, Page Revision 1
Page 7, Page Revision 1
Page 8, Page Revision 0
Page 9, Page Revision 0

Submitted: C. Boggs Date 12-17-70
C. Boggs

Approved: C R West Date 2-10-71
Jesse Aragon

FILE THIS PAGE IN THE MANUAL.

APPENDIX K

Contract Between the U.S. Department of Energy and the Incorporated County of Los Alamos

AWARD/CONTRACT

1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 C.F.R. 350)

RATING

PAGE OF PAGES: See Block 16

2. CONTRACT (Proc. Inst. Ident.) NO.: DE-AC32-93AL64100

3. EFFECTIVE DATE: DEC 01 1992

4. REQUISITION/PURCHASE REQUEST/PROJECT NO.: 32-93AL64100.000

5. ISSUED BY — CODE
U. S. Department of Energy
Los Alamos Area Office
Los Alamos, NM, 87544

6. ADMINISTERED BY (If other than Item 5) — CODE

7. NAME AND ADDRESS OF CONTRACTOR (No., street, city, county, State and ZIP Code)
Incorporated County of Los Alamos
P.O. Box 30
Los Alamos, New Mexico 87544

CODE | FACILITY CODE

8. DELIVERY: See Section F
☐ FOB ORIGIN ☒ OTHER (See below)

9. DISCOUNT FOR PROMPT PAYMENT

10. SUBMIT INVOICES (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN: ITEM See Block 12

11. SHIP TO/MARK FOR — CODE
See Section F

12. PAYMENT WILL BE MADE BY — CODE
U.S. Department of Energy
Financial Management Division
P.O. Box 5400-Albuquerque, NM, 87115

13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION:
☐ 10 U.S.C. 2304(c)( ) ☒ 41 U.S.C. 253(c)(1)

14. ACCOUNTING AND APPROPRIATION DATA
B&R Code: GB0103041 Appropration: 89 X 0240 Funds Obligated: $3,675,395

15A. ITEM NO.	15B. SUPPLIES/SERVICES	15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT
	(See Continuation Pages)				

15G. TOTAL AMOUNT OF CONTRACT ▶ $

16. TABLE OF CONTENTS

(V)	SEC.	DESCRIPTION	PAGE(S)	(V)	SEC.	DESCRIPTION	PAGE(S)
		PART I — THE SCHEDULE				PART II — CONTRACT CLAUSES	
	A	SOLICITATION/CONTRACT FORM	1		I	CONTRACT CLAUSES	1-125
	B	SUPPLIES OR SERVICES AND PRICES/COSTS	1-4			PART III — LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACH.	
	C	DESCRIPTION/SPECS./WORK STATEMENT	4		J	LIST OF ATTACHMENTS	1
	D	PACKAGING AND MARKING	4-5			PART IV — REPRESENTATIONS AND INSTRUCTIONS	
	E	INSPECTION AND ACCEPTANCE	5		K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS	
	F	DELIVERIES OR PERFORMANCE	5				
	G	CONTRACT ADMINISTRATION DATA	6-8		L	INSTRS., CONDS., AND NOTICES TO OFFERORS	
	H	SPECIAL CONTRACT REQUIREMENTS	8-31		M	EVALUATION FACTORS FOR AWARD	

CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE

17. ☒ CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return 3 copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)

18. ☐ AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number _____ including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.

17A. NAME AND TITLE OF SIGNER (Type or print): ACE T. WALTERS, COUNCIL CHAIRMAN

20A. NAME OF CONTRACTING OFFICER: Jerry L. Bellows, Area Manager, Contracting Officer

17B. NAME OF CONTRACTOR: Walter T. Walters (Signature of person authorized to sign)

19C. DATE SIGNED: 11/24/92

20B. UNITED STATES OF AMERICA BY Jerry L. Bellows (Signature of Contracting Officer)

20C. DATE: 11-25-92

SN 7540-01-152-8069
PREVIOUS EDITION UNUSABLE

26 107

STANDARD FORM 26 (REV. 4-85)
Prescribed by GSA
FAR (48 CFR) 53.214(a)

PART I
THE SCHEDULE

SECTION A - AWARD/CONTRACT (STANDARD FORM 26 - COVER)

SECTION B - SUPPLIES OR SERVICES AND PRICES/COSTS

B.01 BACKGROUND AND PURPOSE OF THE CONTRACT

DOE is authorized pursuant to the Department of Energy Organization Act (Public Law 95-91) and other applicable law, including the Atomic Energy Act of 1954, as amended, to provide or otherwise arrange for fire suppression and related facilities and services at project sites where such facilities and services are not available. As permitted by this authority, DOE and the County entered into Contract No. DE-AC04-88AL44118 which was changed in Contract Modification No. M011 to Contract No. DE-AC32-88AL44118. Under Contract No. DE-AC32-88AL44118 the County operated the DOE-owned fire department serving the County of Los Alamos, the DOE's Los Alamos National Laboratory and other property and facilities of DOE, as well as persons and property, within and outside the County.

DOE and the County have now determined that it is to their ıtual benefit for the County to continue operating the ..OE-owned fire department. The County has the authority to and is willing to perform the services specified in this contract.

Since the transfer of the Atomic Energy Commission-owned community to the County in the 1960's, the Government has made annual assistance payments to the County pursuant to the provisions of the Atomic Energy Community Act of 1955, as amended (Public Law 84-221). During this period, it has been the goal of the Government and the County to work towards making the County self-sufficient. One step in achieving this goal has been a concentrated effort in recent years to obtain Congressional approval for a buy-out in the form of a one-time lump-sum payment which would liquidate all remaining obligations of the Government to the County. Another step toward self-sufficiency was the transfer of responsibility for providing fire suppression and related services to the County by means of DOE Contract No. DE-AC32-88AL44118. This contract represents a further step in that process by requiring the County to begin paying the cost of services for the community.

B.02 ITEMS BEING ACQUIRED

The Contractor shall furnish all personnel, equipment, materials, supplies, and services (except as may be expressly set forth in this contract as furnished by the Government) and otherwise do all things necessary for, or incident to, performing and providing the services in strict accordance with all terms and conditions of this contract.

B.03 ESTIMATED COST

The total net estimated cost for this five-year contract is $39,862,355.00, broken down as follows:

	Estimated Costs	Less: County Share (Fixed)	Plus: Management Allowance (Fixed)	Net Estimated Costs
1st Year	$7,350,790	$ 0	$ 0	$ 7,350,790
2nd Year	7,568,368	0	0	7,568,368
3rd Year	7,895,868	118,800	40,600	7,817,668
4th Year	8,299,374	237,600	81,200	8,142,974
5th Year	8,738,687	356,400	121,800	8,504,087
			Total Net Estimated Costs	$39,383,887

The estimated cost for each year shall not be exceeded without prior Contracting Officer approval. No fee shall be paid to the Contractor under this contract; however, a management allowance as described in Paragraph B.05, Management Allowance, shall be paid to the County.

DOE shall reimburse the Contractor for providing the services described herein to the areas identified in Attachment D, "Los Alamos Fire Department Service Area," and to other areas outside the County to the extent provided for in this Contract. The County shall be responsible for all costs of providing these services to any residential, commercial and industrial areas outside of the Municipal Development Area developed after July 28, 1989.

B.04 COUNTY'S SHARE OF COST

The County agrees to assume the cost of community fire protection based on a formula which multiplies the ratio of the 1988 appraised value of the property in the County to the combined appraised value of County and Laboratory property by Contract No. DE-AC32-88AL44118 price as of July 18, 1989,

which was $5,669,692. Based upon this formula the County shall contribute $594,000 annually toward Fire Department operations. This annual amount shall remain fixed at this level unless modified at the request of one of the parties upon agreement that this amount is no longer fair and reasonable.

The County will begin paying a portion of its share of the Fire Department costs as described above beginning the third year of this contract. The County shall phase such payment over a five-year period. The County shall pay 20 percent of $594,000 the third year of the Contract for its full share; 40 percent the fourth year of the Contract; and 60 percent the fifth year of the Contract. If the parties enter into a follow-on contract following the expiration of this Contract, or if this Contract is extended, the County shall continue to phase in payment in 20 percent increments; that is 80 and 100 percent in the next two years respectively. The County's annual share of Fire Department costs shall be deposited in the Special Bank account in twelve monthly installments on the first work day of each month.

B.05 MANAGEMENT ALLOWANCE

In addition to the costs and expenses reimbursed under the Contract Clause entitled "Allowable Cost and Payment," the County shall be given a management allowance, subject to Paragraph B.04 above, of $203,000 annually. This figure represents four percent of one year of operation under Contract No. DE-AC32-88AL44118 as of July 18, 1989, less the County's share of operating costs. This figure shall remain fixed unless the figure given in Paragraph B.04 above, representing the County's full share of Fire Department costs, is changed. DOE reserves the right, however, to request that the County reduce this figure by an amount equal to any savings or additional revenues that DOE may achieve in the County's operation by other means. The County reserves the right to refuse such a request if it does not appear to be in the County's best interest. Payment of the management allowance described in this Paragraph shall be phased in beginning the third year of this contract in 20 percent increments over a five-year period in the same manner in which the County's payment of its share of Fire Department costs is phased in as described in Paragraph B.04 above. DOE shall pay the annual management allowance to the County in twelve equal

monthly installments at the end of each month; provided, however, that in the event of termination or expiration, the final installment shall be retained pending compliance with subparagraph (e) of Paragraph H.16, Advance Payments.

B.06 LIMITATION OF FUNDS

Pursuant to the Contract Clause entitled, "Limitation of Funds," total funds in the amount of $3,675,395 have been allotted for obligation for the first six months with funds obligated every six months thereafter with the issuance of a unilateral modification to this contract. The funds allotted for obligation are available for payment of all allowable costs to be incurred for this contract.

B.07 WORK SCHEDULE

Work schedules will be established to meet the requirements and intent of Section 7(k) of the Fair Labor Standards Act (29 USCA. Section 207[k]) for shift firefighter personnel and a 40 hour-per-week work schedule for all other Fire Department personnel.

SECTION C - DESCRIPTION/SPECIFICATION/WORK STATEMENT

C.01 STATEMENT OF WORK

The Statement of Work is Attachment A to this contract.

C.02 REPORTS

Reports and deliverables shall be submitted by the Contractor in accordance with the provisions of this contract. See Attachment J for listing. This listing may not be inclusive of all the reporting requirements of this contract and the absence of a particular requirement herein does not waive the Contractors responsibility to provide it in the manner and at the time required elsewhere in this contract.

SECTION D - PACKAGING AND MARKING

D.01 PACKAGING

Preservation, packaging, and packing for shipment or mailing of all work deliverable hereunder shall be in accordance with good commercial practice and adequate to insure acceptance by common carrier and safe transportation at the most economical rates.

D.02 MARKING

(a) Each package, report or other deliverable shall be accompanied by a letter or other document which:

(1) Identifies the contract by number under which the item is being delivered.

(2) Identifies the deliverable Item Number or Report Requirement which requires the delivered item(s).

(3) Indicates whether the Contractor considers the delivered item to be a partial or full satisfaction of the requirement.

(b) For any package, report or other deliverable being delivered to a party other than the Contracting Officer, a copy of the document required in (a) above shall be simultaneously provided to the office administering the contract, as identified in Section G of the contract, or if none, to the Contracting Officer.

SECTION E - INSPECTION AND ACCEPTANCE

E.01 INSPECTION

Requirements for inspection are established in FAR Clause 52.246-5 under the Contract Clauses of this contract. Inspection of all items under this contract shall be accomplished by the DOE Technical Representative, or any other duly authorized Government representative of the Contracting Officer.

E.02 ACCEPTANCE

Any acceptance or approval of services under this contract (including reporting requirements) shall be accomplished by the Contracting Officer.

SECTION F - DELIVERIES OR PERFORMANCE

F.01 PERIOD OF PERFORMANCE

This contract shall commence on the effective date of the contract and shall be for a period of five (5) years unless sooner terminated as provided in the article entitled "TERMINATION."

SECTION G - CONTRACT ADMINISTRATION DATA

G.01 CORRESPONDENCE PROCEDURE

(a) To promote timely and effective administration, correspondence, including invoices and reports required by the contract to be submitted to the Government, shall be sent to the Contracting Officer.

U. S. Department of Energy
Los Alamos Area Office
528 35th Street
Los Alamos, NM 87544

(b) All correspondence, including approvals, from the Government to the Contractor shall be sent to the Contract Administrator at the address set forth below:

Contract Administrator
County Administrator
Incorporated County of Los Alamos
P. O. Box 30
Los Alamos, NM 87544

G.02 GOVERNMENT CONTACT FOR POST AWARD ADMINISTRATION

The Contractor shall use the Contracting Officer as the focal point for all matters regarding this contract except as otherwise provided by the Contracting Officer in writing. The Los Alamos Area Office (LAAO) is the contract administration office.

G.03 BILLING INSTRUCTIONS

In connection with the Contract Clause entitled "Allowable Cost and Payment" and Paragraph H.16, Advance Payments, and in order to support the amounts withdrawn from the Special Bank Account, the Contractor shall submit invoices to the Contracting Officer on a monthly basis. Such invoices shall be prepared in compliance with the Billing Instructions set forth in Attachment H of the contract and such other directions as may be provided by the Contracting Officer.

G.04 ANNUAL INDIRECT COST RATE SUBMISSION

(a) In accordance with the contract clause entitled "Allowable Cost and Payment", the Contractor, as soon as possible but not later than one hundred eighty (180) days after the expiration of its fiscal year, shall submit to the indirect cost rate Cognizant Contracting Officer (CCO), identified in paragraph (e) of this clause, a proposed final indirect rate or rates for that period based on the Contractor's actual cost experience during that period, together with supporting data or calculations.

(b) Allowability of costs and acceptability of cost allocation methods shall be determined in accordance with the cost principles in effect as of the date of this contract.

(c) The settlement of final indirect cost rates and indirect costs shall be accomplished prior to the Contracting Officer's approval of the final payment.

(d) Pending settlement of final indirect cost rates for any period, the Contractor shall be reimbursed for indirect rates at billing rates acceptable to the CCO. These billing rates are subject to appropriate adjustments when the final indirect cost rates are settled. The Contractor shall provide to the CCO annually, within 180 days after the expiration of its fiscal year, a billing rate proposal, together with supporting data. If billing rates change substantially at any time during the contract performance period, the Contractor shall notify the CCO in writing. Upon review of the annual billing rate proposal, or any notification of substantial rate change during the contract performance period, the CCO may adjust the approved billing rate. In the event that adjustment is to be applied retroactively, the Contractor shall make appropriate adjustments on its next voucher.

(e) The indirect cost rate CCO and address is as follows:

Herman Smith
U. S. Department of Energy
Albuquerque Operations Office
Financial Management Division
P. O. Box 5400
Albuquerque, New Mexico 87115
Telephone No. (505) 845-4107

The Contractor shall use the CCO as the point of contact for indirect cost rate matters as defined by the contract clause entitled "Allowable Cost and Payment."

(f) The billing rate for indirect costs for the first year of operation will be established as a provisional billing rate of 15% to be applied to salaries and benefits. If, during the period of performance of this contract, provisional rates have not been established for a subsequent period, via a contract modification, then the Contractor shall continue to bill those rates most recently approved by the Contracting Officer, or at lower rates until such time as the contract is modified to reflect the most current approved rates.

SECTION H - SPECIAL CONTRACT REQUIREMENTS

H.01 ADDITIONAL DEFINITIONS

With reference to the Contract Clause entitled "Definitions," and as used in the Statement of Work listed below are definitions which apply to the Contract;

(a) The term "University" means the Regents of the University of California which manages and operates the Los Alamos National Laboratory under DOE Contract No. W-7405-ENG-36.

(b) The terms "Laboratory" or "LANL" mean the Department of Energy owned Los Alamos National Laboratory located in Los Alamos, New Mexico.

(c) The term "County" and "Contractor" are used interchangeably and mean the Incorporated County of Los Alamos.

Interpretation of the terms and conditions of this Agreement shall be made in accordance with the definitions of the most recently published edition of the National Fire Protection Association (NFPA) standards unless such definitions are contrary to the express terms and conditions of this Agreement.

H.02 UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION

(a) Definition. Unclassified Controlled Nuclear Information (UCNI) is defined as, and limited to, sensitive but unclassified Atomic Energy Defense Program information concerning design, production,

utilization, and safeguards of nuclear weapons or material. (See Title 10, Code of Federal Regulations (CFR) Part 1017, for complete details.) Official procedures for access to, and protection and transmission of UCNI are given below.

(b) Legend. Documents originated by the Contractor or furnished by the Government or the University to the Contractor in connection with this contract may contain UCNI as defined in Section 148 of the Atomic Energy Act of 1954, as amended. The following legend will be stamped or typed on the cover of such documents:

UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION
NOT FOR PUBLIC DISSEMINATION

Unauthorized dissemination subject to civil and criminal sanctions under Section 148 of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2168).

The Contractor shall be responsible for protecting such information from unauthorized dissemination in accordance with DOE regulations, requirements, and instructions.

(c) Access. UCNI may only be made available to authorized individuals, which, for purposes of this contract, means only to U. S. citizens who have a need to know in the performance of official duties or DOE authorized activities and who are employees of the Government, employees of a Government contractor or subcontractor, or employees of a prospective Government contractor or subcontractor for the purpose of bidding on a Government contract.

(d) Protection of UCNI. All parties shall be obliged under penalty of law to protect such information as required by 10 CFR 1017.17, such responsibility including, but not limited to, the following:

(1) General. UCNI required protection from unauthorized dissemination. UCNI must be protected and controlled in a manner consistent with that customarily accorded other types of unclassified but sensitive information (e.g.,

proprietary business information, personnel or medical records of employees, attorney-client information). The Contractor shall establish and maintain a system for the protection of UCNI in its possession or under its control that is consistent with the physical protection standards established in this section. Each Authorized Individual or person granted special access to UCNI who receives, acquires, or produces an UCNI or a document or material containing UCNI shall take reasonable and prudent steps to ensure that it is protected from unauthorized dissemination.

(2) Protection in Use or Storage. An Authorized Individual or a person granted special access to UCNI shall maintain physical control over any document or materials containing an UCNI notice that is in use so as to prevent unauthorized access to it. When any document or material containing an UCNI notice is not in use, it must be stored in a secure container (e.g., locked desk or file cabinet) or in a location where access is limited (e.g., locked or guarded office, controlled access facility).

(3) Reproduction. A document or material containing an UCNI notice may be reproduced to the minimum extent necessary consistent with the need to carry out official duties without permission of the originator provided the reproduced document or material is marked and protected in the same manner as the original document or material.

(4) Destruction. A document or material containing an UCNI notice may be disposed of by any method which assures sufficiently complete destruction to prevent its retrieval (providing the disposal is authorized by the Archivist of the United States under 41 CFR 101-11.4 and by agency records disposition schedules).

(5) Transmission.

(i) A document or material containing an UCNI notice must be packaged to prevent disclosure of the presence of UCNI when transmitted by a means which could allow access to the document or material by a person who is not an Authorized Individual or a person granted special access to UCNI. The address and return address must be indicated on the outside of the package.

(ii) A document or material containing an UCNI notice may be transmitted by:

A. U. S. first class, express, certified, or registered mail;

B. Any means approved for the transmission of classified documents or material;

C. An Authorized Individual or a person granted special access to UCNI when he or she can control access to the document or material being transmitted; or

D. Any other means determined by the DOE Assistant Secretary for Defense Programs to be sufficiently secure.

(iii) UCNI may be discussed or transmitted over an unprotected telephone or telecommunications circuit when required by operational considerations. More secure means of communication should be utilized whenever possible.

(6) Automated Data Processing (ADP). UCNI may be processed or produced on any ADP system which is certified for classified information which complies with the guidelines of Office of Management and Budget Circular No. A-130, "Management of Federal Information Resources," or which has been approved for such use in accordance with the provisions of applicable DOE directives.

(e) Penalties. Any person who violates Section 148 of the Atomic Energy Act or any regulation or order of the Head of Agency issued under Section 148 of the Atomic Energy Act, including the requirements of this Paragraph H.02, may be subject to a civil penalty; and may also be subject to a criminal penalty under Section 223 of the Atomic Energy Act of 1954, as amended. The DOE Assistant Secretary for Defense Programs may recommend to the Head of the Agency imposition of this civil penalty which shall not exceed $100,000 for each violation.

H.03 CONFIDENTIALITY OF INFORMATION

(a) To the extent that the work under this contract requires that the Contractor be given access to confidential or proprietary business, technical, or financial information belonging to the Government or other companies, the Contractor shall after receipt thereof, treat such information as confidential and agrees not to appropriate such information to its own use or to disclose such information to third parties unless specifically authorized by the Contracting Officer in writing. The foregoing obligations, however, shall not apply to:

(1) Information which, at the time of receipt by the Contractor, is in the public domain;

(2) Information which is published by others after receipt thereof by the Contractor or otherwise becomes part of the public domain through no fault of the Contractor;

(3) Information which the Contractor can demonstrate was in its possession at the time of receipt thereof and was not acquired directly or indirectly from the Government or other companies pursuant to this contract;

(4) Information which the Contractor can demonstrate was received by it from a third party who did not require the Contractor to hold it in confidence.

(b) The Contractor shall obtain the written agreement, in a form satisfactory to the Contracting Officer, of each employee permitted access, whereby the employee agrees that he or she will not discuss, divulge or disclose any such information or data to any person or entity except those persons within the Contractor's organization directly concerned with the performance of the Contract.

(c) The Contractor agrees, if requested by the Government, to sign an agreement identical, in all material respects, to the provisions of this Para. H.03, with each company supplying information to the Contractor under this contract, and to supply a copy of such agreement to the Contracting Officer. From time to time upon request of the Contracting Officer, the Contractor shall supply the Government with reports itemizing information received as confidential or proprietary and setting forth the company or companies from which the Contractor received such information.

(d) The Contractor agrees that upon request by the Contracting Officer it will execute a DOE approved agreement with any party whose facilities or proprietary data it is given access to or is furnished, restricting use and disclosure of the data or the information obtained from the facilities. Upon request by the Contracting Officer, such an agreement shall also be signed by Contractor personnel.

H.04 REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS

The Representations, Certifications and Other Statements of Offeror, submitted by the Contractor and that apply to this contract, are incorporated here by reference.

H.05 MODIFICATION AUTHORITY

Notwithstanding any of the other provisions of this contract, the Contracting Officer shall be the only individual authorized to:

(a) waive any requirement of this contract, or
(b) modify any term or condition of this contract.

H.06 GOVERNMENT-FURNISHED PROPERTY AND SERVICES

This Paragraph H.06 supplements the Contract Clause entitled, "Government Property (Cost-Reimbursement, Time-and-Material, or Labor-Hour Contracts)."

(a) General. Unless the Contracting Officer and the Contractor agree otherwise, DOE shall furnish, without cost to the Contractor, the property and services listed below subject to procedures prescribed by the Contracting Officer for the performance of this contract. In providing these services, the DOE may use any source available at the LANL. These sources may include the University of California, including any of its sub-contractors, or other sources as DOE may deem appropriate.

(b) Property.

(1) Equipment and Vehicles. The equipment and vehicles described in Attachment B.

(2) Facilities. The facilities described in Attachment C. No alterations to the facilities shall be made without specific written permission from the Contracting Officer; however, such permission shall not be unreasonably withheld.

(3) Supplies. Supplies, parts and materials which are on hand at the termination of Contract No. DE-AC32-88AL44118 shall be furnished to the Contractor and shall be accounted for and included in the Contractor's Property Management System.

(c) Services

(1) Utilities. Gas, electricity, water, steam and sewage.

(2) Telephone Service. Telephone services for local toll and long distance calls with access to the Federal Telephone System. Use of telephone services shall be in accordance with DOE Order 1450.3 dated May 26, 1988.

(3) Central Alarm Center. The computer based alarm system established at the Laboratory will operate as it currently exists, and responsibility for this system will remain with the University. The University through the Government's Central Alarm Station/Central Guard Facility shall notify the Contractor of all alarms and requests for service. Such notification shall include all available information for the Contractor to formulate the required response and tactics.

(4) Maintenance and Repair Services (Vehicles and Facilities). Services for repair and maintenance services for vehicles and facilities in order to keep them in a functional state of repair can be provided by the DOE, its contractors or subcontractors providing these services at the LANL to the extent that they are available.

(5) Health, Safety, and Environmental Services.

(i) Occupational Medicine: Pre-employment and annual physical examinations, as specified by NFPA, DOT, and substance abuse testing for Contractor Fire Department personnel as authorized by the Contracting Officer.

(ii) Emergency Response Training (including hazardous materials) and specific orientation and training on LANL facilities will be provided to Contractor for responses to fire suppression, emergency medical and rescue services.

(iii) Ionizing Radiation: Radiation monitoring services to Contractor fire suppression, emergency medical and rescue services personnel that include dosimetry, bioassay sampling, invivo counting, monitoring and instrumentation. DOE will evaluate the results and provide reports to the Contractor. The Contractor shall administer the issuance and collection of instruments, dosimetry devices, and samples and shall request and schedule services for its employees.

(6) Training. The Contractor may use DOE-owned facilities for training to meet requirements of the contract and is authorized to attend government-sponsored training programs and services.

(7) Communications. Access to the LANL trunk radio system and use of communications equipment is authorized by DOE. In addition, radios on the MEDNET public safety band are assigned to ambulances. In addition, the Contractor may also use the services of the Central Alarm Center, TA-64-1, to handle radio communications for the Fire Department's dispatch function.

(8) Instrumentation. Maintenance and repair services for Government radios and associated equipment and radiation detectors assigned to the Contractor for the performance of this contract.

(9) Security/Protective Services. Necessary Security and Protective services.

(10) Locksmith Services. Locksmith services including locks, lock cores, and keys.

(11) Supplies, Materials and Services Sources. The Contractor will use established sources available to DOE at Los Alamos. These sources include but are not limited to General Services Administration and the Los Alamos National Laboratory (LANL) warehouses to obtain supplies and materials if these sources are determined the most economical to meet the need. Additionally, the Contractor should also request Government rates for travel, lodging, etc., when possible.

H.07 INSURANCE REQUIREMENTS

In accordance with the Contract Clause entitled "Insurance - Liability to Third Persons," the following kinds and minimum amounts of insurance are required during the performance of this contract:

(a) Worker's Compensation and Employer's Liability Insurance:

(1) The amount required by the State of New Mexico under applicable Worker's Compensation and occupational disease statutes.

(2) Employer's liability insurance in the amount of $100,000.

(b) General Liability Insurance: Bodily injury liability coverage written on the comprehensive form of policy of at least $500,000 per occurrence.

(c) Automobile Liability Insurance: Coverage shall be on the comprehensive form of policy. It shall provide for bodily injury and property damage liability covering the operation of all automobiles used in connection with performing the contract. Policies covering automobiles operated in the United States shall provide coverage of at least $200,000 per person and $500,000 per occurrence for bodily injury and $20,000 per occurrence for property damage.

(d) The amount of liability coverage on other policies shall be commensurate with any legal requirements of the locality and sufficient to meet normal and customary claims.

H.08 LIMITATION OF LIABILITY

Notwithstanding anything to the contrary in the Contract Clause entitled "Insurance-Liability to Third Persons" or any other clause of this contract, no provision of this contract waives any of the sovereign immunity or statutory limitation of liability of the State of New Mexico or any of its political subdivisions, governmental entities, or public employees which is applicable to the Contractor.

H.09 PERSONNEL SECURITY "Q" CLEARANCES

All County personnel who are assigned to or oversee the Fire Department and who require a DOE "Q" clearance to perform their contract functions will be required to hold an active DOE "Q" clearance. The Government will conduct and assume all

cost and responsibility for background investigations for "Q" clearances. However, the Contractor shall be responsible for all pre-employment checks necessary to determine an individual's suitability for employment prior to requesting the Government to perform a background investigation on the individual for the purpose of obtaining a "Q" clearance.

H.10 COST PRINCIPLES FOR STATE AND LOCAL GOVERNMENTS

The contractor shall be subject to OMB Circular A-87 , Cost Principles for State and Local Governments. Should OMB Circular A-87 as it exists on the effective date of this contract be amended to impose upon contractors the requirements of the Civilian Employee and Contractor Travel Expenses Act of 1985, Public Law 99-234, the Contractor shall thereafter be required to comply with such amended provisions of OMB Circular A-87 for the remainder of the contract performance period.

H.11 AUDITS OF STATE AND LOCAL GOVERNMENTS

The Contractor shall be subject to OMB Circular A-128, Audits of State and Local Governments

H.12 SUBCONTRACTING PLAN

In accordance with the provision set forth in the clause entitled "Small Business and Small Disadvantaged Business Subcontracting Plan," the Contractor's Subcontracting Plan is attached hereto as Attachment F to the contract and is hereby made a part of this contract.

H.13 CONTRACT REPRESENTATIVES

(a) Department of Energy (DOE)

(1) The Contracting Officer may designate for the contract, a Contracting Officer Representative (COR) who shall be identified to the Contractor in writing by the Contracting Officer. The limitation on the authority of the COR to act for the Contracting Officer shall be set forth in writing and a copy provided to the Contractor.

(2) The Contracting Officer may designate a Technical Representative for this contract who may be an employee of the University of California. Such individual's name shall be identified, in writing, by the Contracting Officer. The duties of the Technical Representative shall be to monitor the contract performance by the Contractor for technical compliance with the terms of the contract and to provide technical advice to the Contracting Officer. The following duties will be performed by the Technical Representative:

(i) <u>Assist with Technical Matters</u>

A. Monitor compliance of Contractor with technical requirements of Contract.

B. Inform the Contracting Officer in writing of any performance failure.

C. In conjunction with the contract requirements establish a tracking system to assist the Government with meeting its Contract obligations. This includes, but is not limited to Government-furnished property and services and timely Government comment on deliverables required by the Contract.

D. Assist the Contractor in interpreting technical requirements of the Contract. All technical questions which cannot be resolved without increasing costs or requiring changes to the Contract shall be reported in writing to the Contracting Officer for immediate resolution. Such reports should contain the facts and recommendations pertinent to the questions at issue.

E. Recommend to the Contracting Officer technical changes required to meet minimum DOE Orders requirements for fire suppression, emergency and rescue services at LANL.

(ii) Monitor the Administrative and Funds Aspects.

A. Notify the Contracting Officer immediately, in writing of any indication that the cost to the Government, for completing performance under the Contract, will exceed the amount stated in the Contract.

B. Report any indication that costs are being incurred which are not appropriately chargeable to the Contract.

(iii) Property Management

Review and make recommendations on the Contractor's request for Government-furnished facilities, supplies materials, and equipment and forward the request to the Contracting Officer for disposition.

(iv) Assist in Closeout of the Contract

Upon expiration or termination of the contract, forward to the Contracting Officer a written statement attesting to the acceptability of the Contractor's technical performance and attesting to the completion of certain elements of the contract work including, but not limited to, submittals, reports, and other deliverables required by the contract.

(3) DOE and the Contractor understand and agree that all activities designated to be performed by the Technical Representative or other employees or agents of the University of California pursuant to this contract are performed for DOE under and pursuant to Contract No. W-7405-ENG-36 between the University and DOE.

(b) County of Los Alamos (County)

The County shall designate, in writing, a full time Contract Manager and an alternate who shall be responsible for the administration of this contract. The Contract Manager shall be authorized and responsible to make and implement decisions within the scope of the contract and authorized to represent the County at meetings on Contract matters.

H.14 PAYMENT FOR OVERTIME PREMIUMS

(a) DOE is in the process of seeking from the Secretary of the United States Department of Labor a waiver for this contract from the requirement of the Contract Work Hours and Safety Standards Act to pay one and one-half times the basic rate of pay for all hours worked in excess of forty hours per week. The requirements of the clause entitled "Contract Work Hours and Safety Standards Act--Overtime Compensation" will not be effective until such time as the Secretary of Labor makes a determination on the request for waiver and then only in the event that the request for waiver is denied. In the event the request for waiver is denied, the clause will be effective retroactively on the effective date of this contract. The Contractor will be notified by letter of the Secretary of Labor's determination as soon as DOE receives it. Upon receipt of notice that the referenced clause is applicable, the Contractor shall submit a cost proposal for any necessary contract price adjustment necessary to cover retroactive and prospective costs of the application of the clause.

(b) The use of overtime for hours worked in excess of the work schedules established pursuant to Paragraph B.07, Work Schedules, is authorized under this contract if the overtime premium does not exceed the amount established by the budget submitted by the Contractor and approved by the Contracting Officer as required by the Statement of Work, Part III, Attachment A, Paragraph IIIA, or the overtime premium is paid for work:

(1) Necessary to cope with emergencies such as those resulting from accidents or natural disasters;

(2) By indirect-labor employees such as those performing duties in connection with administration, protection, transportation, maintenance, standby plant protection, operation of utilities, or accounting; or

(3) That will result in lower overall costs to the Government. However, continued use of overtime to replace or supplement full-time personnel will not be allowed.

(c) Each incident requiring the payment of overtime premiums in excess of the standard work week shall be documented and such documentation shall contain the following information with copies provided to the Contracting Officer:

(1) The identity of the work unit (e.g., department or section in which the requested overtime was used),

together with present work load, staffing, and other data of the affected unit sufficient to permit the Contracting Officer to evaluate the necessity for the overtime; and

(2) An explanation of the effect that denial of the overtime would have had on contract performance.

(3) Documentation explaining how Contracting Officer approval was obtained, where appropriate.

H.15 PRIVACY ACT SYSTEMS OF RECORDS

Reference is made to the Contract Clauses entitled "Privacy Act Notification" and "Privacy Act." The Contractor will be required to operate the following system of records under this contract: Personnel Radiation Exposure Records (System No.DOE-35).

H.16 ADVANCE PAYMENTS

(a) Payments from Funds Available Under the Contract. Within the total funds obligated under this contract the Government, from time to time, shall advance funds necessary for performance of this contract. The payment for allowable costs and indirect costs, or for other payments which the Contracting Officer has specifically approved in writing, shall be made from funds advanced by the Government or otherwise available under the contract. The Contractor shall submit a separate voucher for each installment of indirect costs thirty (30) days after the end of the month covered by the voucher, and shall pay such installment of the indirect cost out of funds advanced by the Government or otherwise available under this contract.

(b) Special Bank Accounts - Use. All advances of Government funds shall be withdrawn pursuant to a Letter of Credit in favor of a bank qualified as a depository for federal monies or, at the option of the Government, shall be made by check payable to the Contractor, and shall be deposited only in the Special Bank Account established by a Special Bank Account Agreement for Use With the Checks-Paid Method of Letter of Credit Financing in the form and containing the provisions set forth in Attachment G of this contract. The Contractor shall likewise deposit in the Special Bank Account any revenues received by the Contractor in connection with the work under this contract. No part of the funds in the Special Bank Account shall be (1) mingled with any funds of the Contractor or (2) used for a purpose other than that of making payments for the management allowance and for costs allowable under this contract or payments for other items specifically

approved in writing by the Contracting Officer and the Contractor's indirect costs as provided for elsewhere in this contract. If the Contracting Officer shall at any time determine that the balance on such bank account exceeds the Contractor's current needs, the Contractor shall promptly make such disposition of the excess as the Contracting Officer may direct.

(c) Title to Funds Advanced. Title to the unexpended balance of any funds advanced and of any bank account established pursuant to this Paragraph H.16 shall remain in the Government and be superior to any claim or lien of the bank of deposit or others. It is understood that an advance to the Contractor hereunder is not a loan to the Contractor, and will not require the payment of interest by the Contractor, and that the Contractor acquires no right, title or interest in or to such advance other than the right to make expenditures therefrom, as provided in this Paragraph H.16.

(d) Review and Approval of Costs Incurred. The Contractor shall prepare and submit monthly (30 days after the end of the report month) a voucher for the total of net expenditures accrued (i.e., net costs incurred) for the period covered by the voucher, and DOE, after audit and appropriate adjustment, will approve such voucher. This approval by DOE will constitute an acknowledgment by DOE that the net costs incurred are allowable under the contract and that they have been recorded in the accounts maintained by the Contractor in accordance with DOE accounting policies, but will not relieve the Contractor of responsibility for DOE's assets in its care, for appropriate subsequent adjustments, or for errors later becoming known to DOE.

(e) Financial Settlement. The Government shall promptly pay to the Contractor the unpaid balance of allowable costs, indirect costs, and the final installment of the management allowance as provided for in Paragraph B.05, Management Allowance, upon expiration of the term of the contract, or completion of the work and its acceptance by the Government after (1) compliance by the Contractor with DOE's patent clearance requirements, and (2) the furnishing by the Contractor of:

(i) an assignment of the Contractor's rights to any refunds, rebates, allowances, accounts receivable, or other credits applicable to allowable costs under the contract;

(ii) a closing financial statement;

(iii) the accounting for Government-owned property required by the Contract Clause entitled "Government Property (Cost-Reimbursement, Time-and-Material or Labor-Hour Contracts)"; and

(iv) a release discharging the Government, its officers, agents, and employees from all liabilities, obligations, and claims arising out of or under this contract subject only to the following exceptions:

(A) specified claims in stated amounts or in estimated amounts where the amounts are not susceptible to exact statement by the Contractor.

(B) claims, together with reasonable expenses incidental thereto, based upon liabilities of the Contractor to third parties arising out of the performance of this contract; provided that such claims are not known to the Contractor on the date of the execution of the release; and provided further that the Contractor gives notice of such claims in writing to the Contracting Officer not more than six years after the date of the release or the date of any notice to the Contractor that the Government is prepared to make final payment, whichever is earlier; and

(C) Claims for reimbursement of costs (other than expenses of the Contractor by reason of any indemnification of the Government against patent liability), including reasonable expenses incidental thereto, incurred by the Contractor under the provisions of this contract relating to patents. In arriving at the amount due the Contractor under this Paragraph H.16, there shall be deducted any claim which the Government may have against the Contractor in connection with this contract, and deductions due under the terms of this contract, and not otherwise recovered by or credited to the Government. The unliquidated balance of the Special Bank Account may be applied to the amount due and any balance shall be returned to the Government forthwith.

(f) Claims. Claims for credit against funds advanced or for payment shall be accompanied by such supporting documents and justifications as the Contracting Officer shall prescribe.

(g) Discounts. The Contractor shall take and afford the Government the advantage of all known and available cash and trade discounts, rebates, allowances, credits, salvage, and commissions unless the Contracting Officer finds that action is not in the best interest of the Government.

(h) Revenues. All revenues accruing to the Contractor in connection with the work under this contract shall be Government property and shall be deposited in the Special Bank Account to be available for payment of allowable costs under this contract, except as shall be otherwise directed in writing by the Contracting Officer.

(i) Direct Payment of Charges. The Government reserves the right, upon 10 days written notice from the Contracting Officer to the Contractor, to pay directly to the persons concerned all amounts due which otherwise would be allowable under this contract. Any payment so made shall discharge the Government of all liability to the Contractor therefore.

H.17 OWNERSHIP OF RECORDS

(a) Government's Records.

(1) Except as is provided in subparagraph (b) of this Paragraph H.17 and as may be otherwise agreed upon by the Government and the Contractor, all records acquired or generated by the Contractor under this contract shall be the property of the Government, and shall be delivered to the Government or otherwise disposed of by the Contractor either as the Contracting Officer may from time to time direct during the progress of the work or, in any event, as the Contracting Officer shall direct upon settlement of this contract. The Contractor shall, subject to DOE's security regulations and requirements and other provisions of the contract, have the right to inspect and at its own expense duplicate any records delivered or to be delivered to the Government by the Contractor under this contract, or to retain duplicates which are in excess of the Government's requirements; provided, however, that nothing in this subparagraph shall constitute any commitments on the part of the Government to retain such records for any period beyond the DOE's customary retention periods for the various types of records.

(2) If the Contractor, pursuant to the New Mexico Public Records Act or any similar "rights to know" type of law or regulation, is requested to disclose any of the Government's records as defined in subparagraph (a)(1) above, the Contractor will not make any such disclosures and shall promptly notify DOE of such request and DOE shall be solely responsible for responding to such request and for any defense against such disclosure and shall have complete control of the defense and all litigation or negotiations associated therewith.

(b) Contractor's Own Records. The following records are considered the property of the Contractor and not within the scope of subparagraph (a) above:

(1) Personnel and medical records and files (excluding personnel radiation exposure records) maintained on individual employees, applicants and former employees;

(2) Worker's compensation files;

(3) Internal health and safety files;

(4) Employee relations records and files, such as records and files pertaining to:

(i) Qualifications or suitability for employment of any employee, applicant, or former employee;

(ii) Employee and union grievances;

(iii) Arbitration proceedings pursuant to the provisions of any labor contract;

(iv) Allegations, investigations, and resolution of employee misconduct;

(v) Employee discipline;

(vi) Employee charges of discrimination;

(vii) Negotiations with any labor organization in connection with any labor contract;

(5) Records and files pertaining to wages, salaries and benefits and wage, salary and benefit administration;

(6) Privileged or confidential Contractor financial information and correspondence between the Fire Department and other segments of the Contractor's organization located separate from the Fire Department; and

(7) Internal legal files. Upon expiration of this contract, however, if requested by DOE, copies of any such records pertaining to employees that continue in the employ of a successor contractor operating the Los Alamos Fire Department shall be, unless otherwise prohibited by law, delivered to the successor contractor.

(c) The provisions of subparagraph (b) above apply to all records described therein without regard to the date or origination of any such record.

(d) Inspection and Audit of Records. All records acquired or generated by the Contractor under this contract in the possession of the Contractor, including those described in subparagraph (b) above, shall be subject to inspection and audit by DOE at all reasonable times, and the Contractor shall afford DOE proper facilities for such inspection and audit; provided, however, that upon request by the Contracting Officer, the Contractor shall deliver such records to a location specified by the Contracting Officer for inspection by DOE.

H.18 FIRE DEPARTMENT MANAGEMENT TEAM

(a) Establishment - The County and the DOE hereby agree to establish a Fire Department Management Team (FDMT) which shall assist in the management of the Fire Department as described by the functions below. The FDMT shall be composed of equal representation from the County and DOE. A minimum of two (2) representatives from each organization shall be appointed to serve on the FDMT as voting members. A maximum of two (2) additional non-voting representatives may be appointed by the voting members of the FDMT. At least one member from each agency shall have technical knowledge and experience of Fire Department-type operations. Establishment of the FDMT shall be within 30 days after award of the contract.

(b) Mission - The mission of the FDMT shall be to provide both the DOE and the County a vehicle by which to collectively review and communicate the Fire Department's ability to provide essential services and to meet Fire Contract requirements. The FDMT shall also provide a forum for the resolution of conflicting interests.

(c) Functions - Specific functions to be performed by the FDMT shall include:

(1) Monitor the operations of the Fire Department to assure compliance with the terms of the Contract.

(2) Review the Fire Department operating procedures to assure that the Fire Department is operated to optimally utilize available resources in the most efficient and economical method possible.

(3) Review the Fire Department development of long range plans to assure that they reflect the future requirements of the Fire Department to meet the Doe and Los Alamos County needs.

(4) Provide recommendation to the Fire Chief to implement changes within the scope of the contract to meet County or DOE requirements for fire suppression, emergency medical, and rescue services.

(5) Review and make recommendations to the County and DOE regarding changes proposed by the Fire Department for staffing and equipment assignments to stations.

(6) Review and recommend for approval the Fire Department's annual operating budget.

(7) Develop for County and DOE approval, written operating procedures that will be used by the FDMT to perform the duties set forth herein. These procedures shall set forth the FDMT's operating rules to be followed in performing its function for issues involving policy. These procedures shall be submitted for DOE and County approval within 60 calendar days after appointment of the FDMT.

(8) Refer issues that cannot be resolved or that are not within the scope of the contract to the County and DOE for resolution.

(9) The FDMT will provide an annual report to the County and DOE on the overall state of the Fire Department. This written report shall be submitted in the first week of August of each year.

H.19 AUTHORITY HAVING JURISDICTION

With respect to the Los Alamos National Laboratory Fire Service Area, as defined in the Statement of Work and Attachment D to this contract, the Contracting Officer shall be the "authority having jurisdiction," as that term is defined in National Fire Protection Association publications. This authority is limited to matters involving the approval of equipment, facilities, and procedures affecting any facility owned by DOE or operated by DOE or any of its contractors.

H.20 EQUIVALENT FEDERAL WAGE RATES

In the performance of this contract the Contractor shall comply with the requirements of U. S. Department of Labor Wage Determination a copy of which is attached to this contract (see

Part III - SECTION J, Attachment I.) Furthermore, Clause(s), "Service Contract Act of 1965, as amended" and "Statement of Equivalent for Federal Hires Rates" are applicable and located in the contract Clauses Section of this Contract.

H.21 SUBCONTRACTS

Prior to the placement of subcontracts and in accordance with the clause, "Subcontract (Cost-Reimbursement and Letter Contract), "the Contractor shall insure that:

(a) They contain all of the clauses of this contract (altered when necessary for proper identification of the contracting parties) which contain a requirement for such inclusion in applicable subcontracts;

(b) Any applicable subcontractor Cost or Pricing Data and a Certificate of Current Cost or Pricing Data (see FAR 15.804-2) and subcontractor Representations and Certifications (see Part IV, Section K); and

(c) Any required prior notice and description of the subcontract is given to the Contracting Officer and any required consent is received. Except as may be expressly set forth therein, any consent by the Contracting Officer to the placement of subcontracts shall not be construed to constitute approval of the subcontractor or any subcontract terms or conditions, determination of the allowability of any cost, revision of this contract or any of the respective obligations of the parties thereunder, or creation of any subcontractor privity of contract with the Government.

(d) The Contractor shall also obtain and furnish to the Contracting Officer either an OCI Disclosure Statement or Representation form in accordance with DEAR 909.570-7 "Organizational Conflicts of Interest Disclosure or Representation" for all subcontractors to be utilized under this contract. No work shall be performed by the subcontractor until the Contracting Officer has cleared the subcontractor for Organizational Conflicts of Interest (OCI).

H.22 RELEASE OF INFORMATION

Any proposed public release of information including publications, exhibits or audiovisual productions pertaining to this contract or the work called for by this contract shall be submitted for approval prior to printing and distribution. Approval authority is HQ DOE, OPA/HQ, Washington, DC. Proposed releases are to be submitted to the Contracting Officer. All proposed releases should conform to the requirements of DOE Order 1340.1A, and 1350.

H.23 AUTOMATED DATA PROCESSING EQUIPMENT (ADPE) USAGE

Requirements for ADPE which were not included in the Contractor's original proposal may not be acquired (leased or purchased) without the prior written consent of the Contracting Officer. Whenever Contracting Officer written consent is required, the Contractor will furnish to the Contracting Officer information concerning the need for and selection of such ADPE, the specific make(s) and model(s), and the lease versus purchase determination.

H.24 AUTOMATED DATA PROCESSING EQUIPMENT (ADPE) LEASING

(a) If the Contractor leases ADPE equipment for use under this contract, the Contractor shall include a provision in the rental contract stating that the Government shall have the unilateral right to exercise any purchase option under the rental contract between the Contractor and the ADPE equipment vendor and to realize any other benefits earned through rental payments.

(b) The Contractor shall furnish a copy of the rental contract to the Contracting Officer.

H.25 APPRAISALS

(a) The Contracting Officer will perform an annual appraisal of the overall Fire Department operation to determine the adequacy of services provided as required in the Contract. Performance criteria will be based on specified service levels and adherence to developed plans, policies, and procedures referenced in the Contract.

(b) Pursuant to paragraph (a) above, the following performance appraisal areas will be evaluated:

(1) General Management and Planning Support. Factors in this area include the Fire Department's performance as an organization in complying with stated goals and mission, organizational planning, staffing, and coordination/cooperation with external sectors.

In addition, this area will address achievement of direct Contract-related objectives and cover activities such as program planning; quality and quantity of work; adherence to cost and schedule commitments; technical information management and reporting; and achievements in development of systems and methods to better meet requirements.

(2) Operations Support. Included in this area are required activities addressing quality assurance; security; information classification and control; facilities

management (facilities maintenance; real and personal property management); and operational safety, health, and environmental activities.

(3) Indirect Administrative Support. This area addresses the reimbursed indirect support to the Fire Department and includes such functions as human resource planning and management, auditing, computing resources management, procurement services, industrial relations, accounting, budgeting, and other indirect support activities (e.g., legal and public affairs) if applicable.

(c) The Contracting Officer will develop a report which will be made available to the Contractor for review and comment; the Contractor will have the opportunity to respond to the Contracting Officer's findings and provide additional information to clarify issues on any performance findings. A final report will be provided to the Contractor which defines final findings, priorities, and timeliness for corrective action.

(d) The following performance descriptors will be used:

(1) Satisfactory - Meets or exceeds the standard of performance; operational activities and tasks conducted in an efficient, timely, and acceptable manner. Deficiencies do not substantively affect performance.

(2) Marginal - Below the standard of performance; deficiencies are such that management attention and corrective action are required.

(3) Unsatisfactory - Below an acceptable standard of performance; serious deficiencies may require management attention and corrective action be taken promptly.

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1. DEAR 952.202-1 DEFINITIONS (APR 1984)

(a) The term "Head of Agency" means the Secretary, Deputy Secretary or Under Secretary of the Department of Energy.

(b) "Contracting Officer" means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.

(c) Except as otherwise provided in this contract, the term "subcontracts" includes, but is not limited to, purchase orders and changes and modifications to purchase orders under this contract.

(d) The term "DOE" means the Department of Energy.

2. FAR 52.203-1 OFFICIALS NOT TO BENEFIT (APR 1984)

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit arising from it. However, this clause does not apply to this contract to the extent that this contract is made with a corporation for the corporation's general benefit.

3. FAR 52.203-3 GRATUITIES (APR 1984)

(a) The right of the Contractor to proceed may be terminated by written notice if, after notice and hearing, the agency head or a designee determines that the Contractor, its agent, or another representative--

(1) Offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official, or employee of the Government; and

(2) Intended, by the gratuity, to obtain a contract or favorable treatment under a contract.

(b) The facts supporting this determination may be reviewed by any court having lawful jurisdiction.

(c) If this contract is terminated under paragraph (a) above, the Government is entitled--

(1) To pursue the same remedies as in a breach of the contract; and

(2) In addition to any other damages provided by law, to exemplary damages of not less than 3 nor more than 10 times the cost incurred by the Contractor in giving gratuities to the person concerned, as determined by the agency head or a designee.

(This subparagraph (c)(2) is applicable only if this contract uses money appropriated to the Department of Defense.)

(d) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

4. FAR 52.203-5 COVENANT AGAINST CONTINGENT FEES (APR 1984)

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent fee.

(b) "Bona fide agency," as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose of securing business, that neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a contractor and subject to the contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.

5. FAR 52.203-6 RESTRICTIONS ON SUBCONTRACTOR SALES TO THE GOVERNMENT (JUL 1985)

(a) Except as provided in (b) below, the Contractor shall not enter into any agreement with an actual or prospective subcontractor, nor otherwise act in any manner, which has or may have the effect of restricting sales by such subcontractors directly to the Government of any item or process (including computer software) made or furnished by the subcontractor under this contract or under any follow-on production contract.

(b) The prohibition in (a) above does not preclude the Contractor from asserting rights that are otherwise authorized by law or regulation.

(c) The Contractor agrees to incorporate the substance of this clause, including this paragraph (c), in all subcontracts under this contract.

6. FAR 52.203-7 ANTI-KICKBACK PROCEDURES (OCT 1988)

(a) Definitions.

"Kickback," as used in this clause, means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided, directly or indirectly, to any prime Contractor, prime Contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a subcontract relating to a prime contract.

"Person," as used in this clause, means a corporation, partnership, business association of any kind, trust, joint-stock company, or individual.

"Prime contract," as used in this clause, means a contract or contractual action entered into by the United States for the purpose of obtaining supplies, materials, equipment, or services of any kind.

"Prime Contractor," as used in this clause, means a person who has entered into a prime contract with the United States.

"Prime Contractor employee," as used in this clause, means any officer, partner, employee, or agent of a prime Contractor.

"Subcontract," as used in this clause, means a contract or contractual action entered into by a prime Contractor or subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind under a prime contract.

"Subcontractor," as used in this clause, (1) means any person, other than the prime Contractor, who offers to furnish or furnishes any supplies, materials, equipment, or services of any kind under a prime contract or a subcontract entered into in connection with such prime contract, and (2) includes any person who offers to furnish or furnishes general supplies to the prime Contractor or a higher tier subcontractor.

"Subcontractor employee," as used in this clause, means any officer, partner, employee, or agent of a subcontractor.

(b) The Anti-Kickback Act of 1986 (41 U.S.C. 51-58) (the Act), prohibits any person from--

(1) Providing or attempting to provide or offering to provide any kickback;

(2) Soliciting, accepting, or attempting to accept any kickback; or

(3) Including, directly or indirectly, the amount of any kickback in the contract price charged by a prime Contractor to the United States or in the contract price charged by a subcontractor to a prime Contractor or higher tier subcontractor.

(c) (1) The Contractor shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in paragraph (b) of this clause in its own operations and direct business relationships.

(2) When the Contractor has reasonable grounds to believe that a violation described in paragraph (b) of this clause may have occurred, the Contractor shall promptly report in writing the possible violation. Such reports shall be made to the inspector general of the contracting agency, the head of the contracting agency if the agency does not have an inspector general, or the Department of Justice.

(3) The Contractor shall cooperate fully with any Federal agency investigating a possible violation described in paragraph (b) of this clause.

(4) The Contracting Officer may (i) offset the amount of the kickback against any monies owed by the United States under the prime contract and/or (ii) direct that the Prime Contractor withhold from sums owed a subcontractor under the prime contract, monies withheld, the amount of the kickback. The Contracting Officer may order that monies withheld under subdivision (c)(4)(ii) of this clause be paid over to the Government unless the Government has already offset those monies under subdivision (c)(4)(i) of this clause. In either case, the Prime Contractor shall notify the Contracting Officer when the monies are withheld.

(5) The Contractor agrees to incorporate the substance of this clause, including this subparagraph (c)(5) but excepting subparagraph (c)(1), in all subcontracts under this contract.

7. FAR 52.203-9 REQUIREMENT FOR CERTIFICATE OF PROCUREMENT INTEGRITY MODIFICATION (SEP 1990)

(a) Definition. The definitions set forth in FAR 3,104-4 are hereby incorporated in this clause.

(b) The Contractor agrees that it will execute the certification set forth in paragraph (c) of this clause when requested by the Contracting Officer in connection with the execution of any modification of this contract.

(c) Certification. As required in paragraph (b) of this clause, the officer or employee responsible for the modification proposal shall execute the following certification:

CERTIFICATE OF PROCUREMENT INTEGRITY - MODIFICATION (SEP 1990)

(1) I, (Name of certifier) am the officer or employee responsible for the preparation of this modification proposal and hereby certify that, to the best of my knowledge and belief, with the exception of any information described in this certification, I have no information concerning a violation or possible violation of subsection 27(a), (b), (d), or (f) of the Office of Federal Procurement Policy Act, as amended* (41 U.S.C. 423), (hereinafter referred to as "the Act"), as implemented in the FAR, occurring during the conduct of this procurement (contract and modification number).

(2) As required by subsection 27(e)(1)(B) of the Act, I further certify that to the best of my knowledge and belief, each officer, employee, agent, representative, and consultant of (Name of Offeror) who has participated personally and substantially in the preparation or submission of this proposal has certified that he or she is familiar with, and will comply with, the requirements of subsection 27(a) of the Act, as implemented in the FAR, and will report immediately to me any information concerning a violation or possible violation of subsections 27(a), (b), (d), or (f) of the Act, as implemented in the FAR, pertaining to this procurement.

(3) Violations or possible violations: (Continue on plain bond paper if necessary and label Certificate of Procurement Integrity - Modification (Continuation Sheet), ENTER "NONE" IF NONE EXISTS)

_____

_____

_____

_____

(Signature of the officer or employee responsible for the modification proposal and date)
(Typed name of the officer or employee responsible for the modification proposal)

*The Act became effective on December 1, 1990.
THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER TITLE 18, UNITED STATES CODE, SECTION 1001.

(End of certification)

(d) In making the certification in paragraph (2) of the certificate, the officer or employee of the competing Contractor responsible for the offer or bid, may rely upon a one-time certification to the competing Contractor, supplemented by periodic training. These certifications shall be maintained by the Contractor for a period of 6 years from the date a certifying employee's employment with the company ends or, for an agency, representative, or consultant, 6 years from the date such individual ceases to act on behalf of the contractor.

(e) The certification required by paragraph (c) of this clause is a material representation of fact upon which reliance will be placed in executing this modification.

8. FAR 52.203-10 PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (SEPT 1990)

(a) The Government, at its election, may reduce the price of a fixed-price-type contract or contract modification and the total cost and fee under a cost-type contract or contract modification by the amount of profit or fee determined as set forth in paragraph (b) of this clause if the head of the contracting activity or his or her designee, determines that there was a violation of subsection 27(a) of the Office of Federal Procurement Policy Act as amended (41 U. S. C. 423) as implemented in the FAR. In the case of a contract modification, the fee subject to reduction is the fee specified in the particular contract modification at the time of execution, except as provided in subparagraph (b)(5) of this clause.

(b) The price or fee reduction referred to in paragraph (a) of this clause shall be--

(1) For cost-plus-fixed-fee contracts, the amount of the fee specified in the contract at the time of award;

(2) For cost-plus-incentive-fee contracts, the target fee specified in the contract at the time of award notwithstanding any minimum fee or "fee floor" specified in the contract.

(3) For cost-plus-award-fee contracts--

(i) The base fee established in the contract at the time of contract award;

(ii) If no base fee is specified in the contract, 10 percent of the amount of each award fee otherwise payable to the contractor for each incentive period or at each award fee determination point.

(4) For fixed-price-incentive contracts, the Government may--

(i) Reduce the contract target price and contract target profit both by an amount equal to the initial target profit specified in the contract at the time of contract award, or;

(ii) If an immediate adjustment to the contract target price and contract target profit would have a significant adverse impact on the incentive price revision relationship under the contract, or adversely affect the contract financing provisions, the Contracting Officer may defer such adjustment until establishment of the total final price of the contract.

The total final price established in accordance with the incentive price revision provisions of the contract shall be reduced by an amount equal to the initial target profit specified in the contract at the time of contract award and such reduced price shall be the total final contract price.

(5) For firm-fixed-price contract or contract modifications, by 10 percent of the initial contract price; 10 percent of the contract modification price; or a profit amount determined by the Contracting Officer from records or documents in existence prior to the date of the contract award or modification.

(c) The Government may, at its election, reduce a prime contractor's price or fee in accordance with the procedures of paragraph (b) of this clause for violations of the Act by its subcontractors by an amount not to exceed the amount of profit or fee reflected in the subcontract at the time the subcontract was first definitively priced.

(d) In addition to the remedy in paragraph (a) of this clause, the Government may terminate this contract or modification for default. The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law or under this contract.

9. FAR 52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JAN 1990)

(a) Definitions.

"Agency," as used in this clause, means executive agency as defined in 2.101.

"Covered Federal action," as used in this clause, means any of the following Federal actions:

(a) The awarding of any Federal contract.

(b) The making of any Federal grant.

(c) The making of any Federal Loan.

(d) The entering into of any cooperative agreement.

(e) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

"Indian tribe" and "tribal organization" as used in this clause, have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) and include Alaskan Natives.

"Influencing or attempting to influence," as used in this clause, means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government," as used in this clause, means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency," as used in this clause, includes the following individuals who are employed by an agency:

(a) An individual who is appointed to a position in the Government under title 5, United States Code, including a position under a temporary appointment.

(b) A member of the uniformed services, as defined in subsection 101(3), title 37, United States Code.

(c) A special Government employee, as defined in Section 202, Title 18, United States Code.

(d) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, Title 5, United States Code, Appendix 2.

"Person," as used in this clause, means an individual, corporation, company, association, authority, firm, partnership, society, State, or local government, regardless of whether such entity is operated for profit, or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation," as used in this clause, means with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment," as used in this clause, means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient," as used in this clause, includes the Contractor and all subcontractors. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed," as used in this clause,means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State," as used in this clause, means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibitions

(1) Section 1352 of Title 31, United States Code, among other things, prohibits a recipient of a Federal contract, grant, loan, or cooperative agreement from using appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan, the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The Act also requires Contractors to furnish a disclosure if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for

influencing or attempting to influence an officer or employee of any agency, a Member of Congress, or an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

(3) The prohibitions of the Act do not apply under the following conditions:

(i) Agency and legislative liaison by own employees.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action if the payment is for agency and legislative liaison activities nor directly related to a covered Federal action.

(B) For purposes of subdivision (b)(3)(i)(A) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

(C) The following agency and legislative liaison activities are permitted at any time where they are not related to a specific solicitation for any covered Federal action:

(1) Discussing with an agency the qualities and characteristics (including individual demonstrations) of the person's products or services, conditions or terms of sale, and service capabilities.

(2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(D) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action.

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and

(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Pub.L.95-507, and subsequent amendments.

(E) Only those services expressly authorized by subdivision (b)(3)(i)(A) of this clause are permitted under this clause.

(ii) Professional and technical services.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of:

(1) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification or a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.

(2) Any reasonable payment to a person other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(B) For purposes of subdivision (b)(3)(ii)(A) of this clause, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable.

Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provided advice and analysis directly applying their professional or technical expertise and unless the

advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provided legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission, or negotiation of a covered Federal action.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation and any other requirements in the actual award documents.

(D) Only those services expressly authorized by subdivisions (b)(3)(ii)(A)(1) and (2) of this clause are permitted under this clause.

(E) The reporting requirements of FAR 3.803(a) shall not apply with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

(iii) Disclosure.

(A) The Contractor who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, OMB standard form LLL, Disclosure of Lobbying Activities, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under subparagraph (b)(1) of this clause, if paid for with appropriated funds.

(B) The Contractor shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under subparagraph (c)(1) of this clause. An event that materially affects the accuracy of the information reported includes--

(1) A cumulative increase of $25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

(2) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action;
or

(3) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(C) The Contractor shall require the submittal of a certification, and if required, a disclosure form by any person which requests or received any subcontract exceeding $100,000 under the Federal contract.

(D) All subcontractor disclosure forms (but not certifications) shall be forwarded from tier to tier until received by the prime Contractor. The prime Contractor shall submit all disclosures to the Contracting Officer at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding Contractor.

(iv) Agreement. The Contractor agrees not to make any payment prohibited by the clause.

(v) Penalties.

(A) Any person who makes an expenditure prohibited under paragraph (a) of this clause or who fails to file or amend the disclosure form to be filed or amended by paragraph (b) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

(B) Contractors may rely without liability on the representation made by their subcontractors in the certification and disclosure form.

(vi) Cost allowability. Nothing in this clause makes allowable or reasonable any cost which would otherwise be unallowable or unreasonable. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any other provision.

10. DEAR 952.204-2 SECURITY (OCT 1987)

(a) Responsibility. It is the contractor's duty to safeguard all classified information, special nuclear material, and other DOE property. The Contractor shall, in accordance with DOE security regulations and requirements, be responsible for safeguarding all classified information, and protecting against sabotage, espionage, loss and theft, the classified documents and material in the Contractor's possession in connection with the performance of work under this contract. Except as otherwise expressly provided in this contract, the Contractor shall, upon completion or termination of this contract, transmit to DOE any classified matter in the possession of the Contractor or any person under the Contractor's control in connection with performance of this contract. If retention by the Contractor of any classified matter is required after the completion or termination of the contract and such retention is approved by the Contracting Officer, the Contractor will complete a certificate of possession to be furnished to DOE specifying the classified matter to be retained. The certification shall identify the items and types or categories of retained, the conditions governing the retention of the matter, and the period of retention, if known. If the retention is approved by the Contracting Officer, the security provisions of the contract will continue to be applicable to the matter retained. Special nuclear material will not be retained after the completion or termination of the contract.

(b) Regulations. The Contractor agrees to conform to all security regulations and requirements of DOE.

(c) Definition of Classified Information. The term "Classified Information" means Restricted Data, Formerly Restricted Data, or National Security Information.

(d) Definition of Restricted Data. The term "Restricted Data" means all data concerning (1) design, manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category pursuant to Section 142 of the Atomic Energy Act of 1954, as amended.

(e) Definition of Formerly Restricted Data. The term "Formerly Restricted Data" means all data removed from the Restricted Data category under section 142 d. of the Atomic Energy Act of 1954, as amended.

(f) Definition of National Security Information. The term "National Security Information" means any information or material, regardless of its physical form or characteristics,

that is owned by, produced for or by, or is under the control of the United States Government, that has been determined pursuant to Executive Order 12356 or prior Orders to require protection against unauthorized disclosure, and which is so designated.

(g) Definition of Special Nuclear Material (SNM). SNM means (1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954, as amended, has been determined to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material.

(h) Security clearance of personnel. The Contractor shall not permit any individual to have access to any classified information, except in accordance with the Atomic Energy Act of 1954, as amended, Executive Order 12356, and the DOE's regulations or requirements applicable to the particular level and category of classified information to which access is required.

(i) Criminal liability. It is understood that disclosure of any classified information relating to the work or services ordered hereunder to any person not entitled to receive it, or failure to safeguard any classified information that may come to the Contractor or any person under the Contractor's control in connection with work under this contract, may subject the Contractor, its agents, employees, or subcontractors to criminal liability under the laws of the United States. (See the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 et seq.; 18 U.S.C. 793 and 794; and Executive Order 12356).

(j) Subcontracts and purchase orders. Except as otherwise authorized in writing by the Contracting Officer, the Contractor shall insert provisions similar to the foregoing in all subcontracts and purchase orders under this contract.

11. DEAR 952.204-70 CLASSIFICATION (APR 1984)

In the performance of the work under this contract, the Contractor shall ensure that an Authorized Original Classifier or Derivative Classifier shall assign classifications to all documents, material, and equipment originated or generated under the contract in accordance with classification regulations and guidance furnished to the Contractor by the DOE. Every subcontract and purchase order issued hereunder involving the origination or generation of classified documents, material, or equipment shall include a provision to the effect that in the performance of such subcontract or purchase order, the subcontractor or supplier shall ensure that an Authorized

Original Classifier or Derivative Classifier shall assign classifications to all such documents, materials, and equipment in accordance with classification regulations and guidance furnished to such subcontractor or supplier by the Contractor.

12. DEAR 952.204-74 FOREIGN OWNERSHIP, CONTROL, OR INFLUENCE OVER CONTRACTOR (APR 1984)

(a) For purposes of this clause, a foreign interest is defined as any of the following:

(1) A foreign government or foreign government agency;

(2) Any form of business enterprise organized under the laws of any country other than the United States or its possessions;

(3) Any form of business enterprise organized or incorporated under the laws of the U.S., or a State or other jurisdiction within the U.S., which is owned, controlled, or influenced by a foreign government, agency, firm, corporation or person; or

(4) Any person who is not a U.S. citizen.

(b) Foreign Ownership, Control, or Influence (FOCI) means the situation where the degree of ownership, control, or influence over a contractor by a foreign interest is such that a reasonable basis exists for concluding that compromise of classified information, special nuclear material as defined in 10 CFR Part 710, may result.

(c) For purposes of this clause, subcontractor means any subcontractor at any tier and the term "contracting officer" shall mean DOE contracting officer. When this clause is included in a subcontract, the term "contractor" shall mean subcontractor and the term "contract" shall mean subcontract.

(d) The contractor shall immediately provide the contracting officer written notice of any changes in the extent and nature of FOCI over the contractor which would affect the answers to the questions presented in DEAR 952.204-73. Further, notice of changes in ownership or control which are required to be reported to the Securities and Exchange Commission, the Federal Trade Commission, or the Department of Justice shall also be furnished concurrently to the contracting officer.

(e) In those cases where a contractor has changes involving FOCI, the DOE must determine whether the changes will pose an undue risk to the common defense and security. In making

this determination, the contracting officer shall consider proposals made by the contractor to avoid or mitigate foreign influences.

(f) If the contracting officer at any time determines that the contractor is, or is potentially, subject to FOCI, the contractor shall comply with such instructions as the contracting officer shall provide in writing to safeguard any classified information or significant quantity of special nuclear material.

(g) The contractor agrees to insert terms that conform substantially to the language of this clause including this paragraph (g) in all subcontracts under this contract that will require access to classified information or a significant quantity of special nuclear material. Additionally, the contractor shall require such subcontractors to submit a completed certification required in DEAR 952.204-73 prior to award of a subcontract. Information to be provided by a subcontractor pursuant to this clause may be submitted directly to the contracting officer.

(h) Information submitted by the contractor or any affected subcontractor as required pursuant to this clause shall be treated by DOE to the extent permitted by law, as business or financial information submitted in confidence to be used solely for purposes of evaluating FOCI.

(i) The requirements of this clause are in addition to the requirement that a contractor obtain and retain the security clearances required by the contract. This clause shall not operate as a limitation on DOE's rights, including its rights to terminate this contract.

(j) The contracting officer may terminate this contract for default either if the contractor fails to meet obligations imposed by this clause, e.g., provide the information required by this clause, comply with the contracting officer's instructions about safeguarding classified information, or make this clause applicable to subcontractors, or if, in the contracting officer's judgment, the contractor creates a FOCI situation in order to avoid performance or a termination for default. The contracting officer may terminate this contract for convenience if the contractor becomes subject to FOCI and for reasons other than avoidance of performance of the contract, cannot, or chooses not to, avoid or mitigate the FOCI problem.

13. DEAR 952.208-70 PRINTING (APR 1984)

The contractor shall not engage in, nor subcontract for, any printing (as that term is defined in Title I of the U.S. Government Printing and Binding Regulations in effect on the

effective date of this contract) in connection with the performance of work under this contract. Provided, however, that performance of a requirement under this contract involving the duplication of less than 5,000 copies of a single unit, or no more than 25,000 units in the aggregate of multiple units, will not be deemed to be printing. A unit is defined as one sheet, size 8 1/2 by 11 inches one side only, one color. A requirement is defined as a single publication document.

(1) The term "printing" includes the following processes: composition, plate making, presswork, binding, microform publishing, or the end items produced by such processes.

(2) If fulfillment of the contract will necessitate reproduction in excess of the limits set forth above, the contractor shall notify the contracting officer in writing and obtain the contracting officer's approval prior to acquiring on DOE's behalf production, acquisition, and dissemination of printed matter. Such printing must be obtained from the Government Printing Office (GPO), a contract source designated by GPO or a Joint Committee on Printing authorized federal printing plant.

(3) Printing services not obtained in compliance with this guidance will result in the cost of such printing being disallowed.

(4) The Contractor will include in each of his subcontracts hereunder a provision substantially the same as this clause including this paragraph (4).

14. FAR 52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUN 1991)

(a) The Government suspends or debars Contractors to protect the Government's interests. Contractors shall not enter into any subcontract in excess of the small purchase limitation at FAR 13.000 with a Contractor that has been debarred, suspended, or proposed for debarment unless there is a compelling reason to do so.

(b) The Contractor shall require each proposed first-tier subcontractor, whose subcontract will exceed the small purchase limiation at FAR 13.000, to disclose to the Contractor, in writing, whether as of the time of award of the subcontract, the subcontractor, or its principals, is or is not debarred, suspended, or proposed for debarment by the Federal Government.

(c) A corporate officer or designee of the Contractor shall notify the Contracting Officer, in writing, before entering into such subcontract with a party that is debarred, suspended, or proposed for debarment (see FAR 9.404 for information on the List of Parties Excluded from Procurement Programs). The notice must include the following:

(1) The name of the subcontractor;

(2) The Contractor's knowledge of the reasons for the subcontractor being on the list of Parties Excluded from Procurement Programs;

(3) The compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the list of Parties Excluded from Procurement Programs; and

(4) The systems and procedures the Contractor has established to ensure that it is fully protecting the Government's interests when dealing with such subcontractor in view of the specific basis for the party's debarment, suspension, or proposed debarment.

(End of Clause)

15. DEAR 952.209-71 ORGANIZATIONAL CONFLICTS OF INTEREST-GENERAL (APR 1984)

(a) The Contractor warrants that, to the best of his knowledge and belief, and except as otherwise disclosed, there are no relevant facts which could give rise to organizational conflicts of interest, as defined in CFR 909.570 or that the Contractor has disclosed all relevant information.

(b) The Contractor agrees that, if after award, an organizational conflict of interest with respect to this contract is discovered, an immediate and full disclosure in writing shall be made to the Contracting Officer which shall include a description of the action which the contractor has taken or proposes to take to avoid or mitigate such conflicts. The Department may, however, terminate the contract for its convenience if it deems such termination to be in the best interest of the Government.

(c) In the event that the Contractor was aware of an organizational conflict of interest prior to the award of this contract and did not disclose the conflict to the Contracting Officer, the Government may terminate the contract for default.

(d) The provisions of this clause shall be included in all subcontracts for work to be performed similar to the service provided by the prime Contractor, and the terms "contract," "Contractor," and "Contracting Officer" modified appropriately to preserve the Government's rights.

(e) Prior to a contract modification when the Statement of Work is modified to add new work, the period of performance is significantly increased, or the parties to the contract are changed, the Department will request and the Contractor is required to submit either an organizational conflict of interest disclosure or representation (see 48 CFR 904.70 and 909.5), or an update of the previously submitted disclosure or representation.

16. FAR 52.212-13 STOP-WORK ORDER - (AUG 1989) ALTERNATE I

(a) The Contracting Officer may, at any time, by written order to the Contractor, require the Contractor to stop all, or any part, of the work called for by this contract for a period of 90 days after the order is delivered to the Contractor, and for any further period to which the parties may agree. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allowable to the work covered by the order during the period of work stoppage. Within a period of 90 days after a stop-work order is delivered to the Contractor, or within any extension of that period to which the parties shall have agreed, the Contracting Officer shall either-

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Termination clause of this contract.

(b) If a stop-work order issued under this clause is canceled or the period of the order or any extension thereof expires, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule, the estimated cost, the fee, or a combination thereof, and in any other terms of the contract that may be affected and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allowable to, the performance of any part of this contract; and

(2) The Contractor asserts a claim for the adjustment within 30 days after the end of the period of work stoppage; provided, that, if the Contracting Officer decides to justify the action, the Contracting Officer may receive and act upon the claim asserted at any time before payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

17. DEAR 952.212-71 PRIORITIES AND ALLOCATIONS (ATOMIC ENERGY) (JUN 1987)

The Contractor shall follow the provisions of the Defense Priorities and Allocations System (DPAS) regulation (see 15 CFR Part 350) in obtaining controlled materials and other products and materials needed to fill this contract.

18. FAR 52.215-1 EXAMINATION OF RECORDS BY COMPTROLLER GENERAL (APR 1984)

(a) This clause applies if this contract exceeds $10,000 and was entered into by negotiation.

(b) The Comptroller General of the United States or a duly authorized representative from the General Accounting Office shall, until 3 years after final payment under this contract or for any shorter period specified in Federal Acquisition Regulation (FAR) Subpart 4.7, Contractor Records Retention, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract.

(c) The Contractor agrees to include in first-tier subcontracts under this contract a clause to the effect that the Comptroller General or a duly authorized representative from the General Accounting Office shall, until 3 years after final payment under the subcontract or for any shorter period specified in FAR Subpart 4.7, have access to and the right to examine any of the subcontractor's directly pertinent books, documents,

papers, or other records involving transactions related to the subcontract. "Subcontract," as used in this clause, excludes (1) purchase orders not exceeding $10,000 and (2) subcontracts or purchase orders for public utility services at rates established to apply uniformly to the public, plus any applicable reasonable connection charge.

(d) The periods of access and examination in paragraphs (b) and (c) above for records relating to (1) appeals under the Disputes clause, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the Comptroller General or a duly authorized representative from the General Accounting Office has taken exception shall continue until such appeals, litigation, claims, or exceptions are disposed of.

19. FAR 52.215-2 AUDIT--NEGOTIATION (DEC 1989)

(a) Examination of costs. If this is a cost-reimbursement, incentive, time-and-materials, labor-hour, or price-redeterminable contract, or any combination of these, the Contractor shall maintain-and the Contracting Officer or representatives of the Contracting Officer shall have the right to examine and audit books, records, documents, and other evidence and accounting procedures and practices, regardless of form (e.g. data bases, applications software, data base management software, utilities, etc.), sufficient to reflect properly all costs claimed to have been incurred or anticipated to be incurred in performing this contract. This right of examination shall include inspection at all reasonable times of the Contractor's plants, or parts of them, engaged in performing the contract.

(b) Cost or pricing data. If, pursuant to law, the Contractor has been required to submit cost or pricing data in connection with pricing this contract or any modification to this contract, the Contracting Officer or representatives of the Contracting Officer who are employees of the Government shall have the right to examine and audit all of the Contractor's books, records, documents, and other data, regardless of form (e.g., machine readable media such as disk, tape, etc.) or type (e.g., data bases, applications software, data base management software, utilities, etc.), including computations and projections related to proposing, negotiating, pricing, or performing the contract or modification in order to evaluate the accuracy, completeness, and currency of the cost or pricing data. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used.

(c) Reports. If the Contractor is required to furnish cost, funding, or performance reports, the Contracting Officer or representatives of the Contracting Officer who are employees of the Government shall have the right to examine and audit books, records, other documents, and supporting materials, for the purpose of evaluating (1) the effectiveness of the Contractor's policies and procedures to produce data compatible with the objectives of these reports and (2) the data reported.

(d) Availability. The Contractor shall make available at its office at all reasonable times the materials described in paragraphs (a) and (b) above, for examination, audit, or reproduction, until 3 years after final payment under this contract, or for any shorter period specified in Subpart 4.7, Contractor Records Retention, of the Federal Acquisition Regulation, or for any longer period required by statute or by other clauses of this contract. In addition-

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement; and

(2) Records relating to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are disposed of.

(e) Except as otherwise provided in FAR Subpart 4.7, Contractor Records Retention, the Contractor may transfer computer data in machine readable form from one reliable computer medium to another. The Contractor's computer data retention and transfer procedures shall maintain the integrity, reliability, and security of the original data. The contractor's choice of form or type of materials described in paragraphs (a), (b), and (c) of this clause affects neither the Contractor's obligations nor the Government's rights under this clause.

(f) The Contractor shall insert a clause containing all the terms of this clause, including this paragraph (f), in all subcontracts over $10,000 under this contract, altering the clause only as necessary to identify properly the contracting parties and the Contracting Officer under the Government prime contract.

20. FAR 52.215-33 ORDER OF PRECEDENCE (JAN 1986)

Any inconsistency in this solicitation or contract shall be resolved by giving precedence in the following order: (a) the Schedule (excluding the specifications); (b) representations and other instructions; (c) contract clauses; (d) other documents, exhibits, and attachments; and (e) the specifications.

(End of Clause)

21. FAR 52.215-22 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA (JAN 1991)

(a) If any price, including profit or fee, negotiated in connection with this contract, or any cost reimbursable under this contract, was increased by any significant amount because--

(1) the Contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data,

(2) a subcontractor or prospective subcontractor furnished the Contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data, or

(3) any of these parties furnished data of any description that were not accurate, the price or cost shall be reduced accordingly and the contract shall be modified to reflect the reduction.

(b) Any reduction in the contract price under paragraph (a) above due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which (1) the actual subcontract or (2) the actual cost to the Contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.

(c) (1) If the Contracting Officer determines under paragraph (a) of this clause that a price or cost reduction should be made, the Contractor agrees not to raise the following matters as a defense:

(i) The Contractor or subcontractor was a sole source supplier or otherwise was in a superior bargaining position and thus the price of the contract would not have been modified even if accurate, complete, and current cost or pricing data had been submitted.

(ii) The Contracting Officer should have known that the cost or pricing data in issue were defective even though the Contractor or subcontractor took no affirmative action to bring the character of the data to the attention of the Contracting Officer.

(iii) The contract was based on an agreement about the total cost of the contract and there was no agreement about the cost of each item procured under the contract.

(iv) The Contractor or subcontractor did not submit a Certificate of Current Cost or Pricing Data.

(2) (i) Except as prohibited by subdivision (c)(2)(ii) of this clause, an offset in an amount determined appropriate by the Contracting Officer based upon the facts shall be allowed against the amount of a contract price reduction if--

(A) The Contractor certifies to the Contracting Officer that, to the best of the Contractor's knowledge and belief, the Contractor is entitled to the offset in the amount requested; and

(B) The Contractor proves that the cost or pricing data were available before the date of agreement on the price of the contract (or price of the modification) and that the data were not submitted before such date.

(ii) An offset shall not be allowed if--

(A) The understated data was known by the Contractor to be understated when the Certificate of Current Cost or Pricing Data was signed; or

(B) The Government proves that the facts demonstrate that the contract price would not have increased in the amount to be offset even if the available data had been submitted before the date of agreement on price.

(d) If any reduction in the contract price under this clause reduces the price of items for which payment was made prior to the date of the modification reflecting the price reduction, the Contractor shall be liable to and shall pay the United States at the time such overpayment is repaid --

(1) Simple interest on the amount of such overpayment to be computed from the date(s) of overpayment to the Contractor to the date the Government is repaid by the Contractor at the applicable underpayment rate effective for each quarter prescribed by the Secretary of the Treasury under 36 U.S.C. 6621(a)(2): and

(2) For Department of Defense contracts only, a penalty equal to the amount of the overpayment, if the Contractor or subcontractor knowingly submitted cost or pricing data which were incomplete, inaccurate, or noncurrent.

22. FAR 52.215-24 SUBCONTRACTOR COST OR PRICING DATA (APR 1985)

(a) Before awarding any subcontract expected to exceed $100,000 when entered into, or before pricing any subcontract modification involving a pricing adjustment expected to exceed $100,000, the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless the price is--

(1) Based on adequate price competition;

(2) Based on established catalog or market prices of commercial items sold in substantial quantities to the general public; or

(3) Set by law or regulation.

(b) The Contractor shall require the subcontractor to certify in substantially the form prescribed in Subsection 15.804-4 of the Federal Acquisition Regulation (FAR) that, to the best of its knowledge and belief, the data submitted under paragraph (a) above were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(c) In each subcontract that exceeds $100,000 when entered into, the Contractor shall insert either--

(1) The substance of this clause, including this paragraph (c), if paragraph (a) above requires submission of cost or pricing data for the subcontract; or

(2) The substance of the clause at FAR 52.215-25, Subcontractor Cost or Pricing Data-Modifications.

23. FAR 52.215-27 TERMINATION OF DEFINED BENEFIT PENSION PLANS (SEP 1989)

The Contractor shall promptly notify the Contracting Officer in writing when it determines that it will terminate a defined benefit pension plan or otherwise recpature such pension fund assets. If pension fund assets revert to the Contractor or are

constructively received by it under a termination or otherwise, the Contractor shall make a refund or give a credit to the Government for its equitable share as required by FAR 31.205-6(j)(4). The Contractor shall include the substance of this clause in all subcontracts under this contract which meet the applicability requirement of FAR 15.804(e).

24. DEAR 952.216-7 ALLOWABLE COST AND PAYMENT (JUL 1991)

(a) Invoicing. The Government shall make payments to the Contractor when requested as work progresses, but (except for small business concerns) not more often than once every 2 weeks, in amounts determined to be allowable by the Contracting Officer in accordance with Subpart 31.6 of the Federal Acquisition Regulation (FAR) in effect on the date of this contract and the terms of this contract. The Contractor may submit to an authorized representative of the Contracting Officer, in such form and reasonable detail as the representative may require, an invoice or voucher supported by a statement of the claimed allowable cost for performing this contract.

(b) Reimbursing costs.

(1) For the purpose of reimbursing allowable costs (except as provided in subparagraph (2) below, with respect to pension, deferred profit sharing, and employee stock ownership plan contributions), the term "costs" includes only--

(i) Those recorded costs that, at the time of the request for reimbursement, the Contractor has paid by cash, check, or other form of actual payment for items or services purchased directly for the contract;

(ii) When the Contractor is not delinquent in paying costs of contract performance in the ordinary course of business, costs incurred, but not necessarily paid, for--

(A) Materials issued from the Contractor's inventory and placed in the production process for use on the contract;

(B) Direct labor;

(C) Direct travel;

(D) Other direct in-house costs; and

(E) Properly allocable and allowable indirect costs, as shown in the records maintained by the Contractor for purposes of obtaining reimbursement under Government contracts; and

(iii) The amount of progress payments that have been paid to the Contractor's subcontractors under similar cost standards.

(2) Contractor contributions to any pension or other postretirement benefit, profit- sharing, or employee stock ownership plan funds that are paid quarterly or more often may be included in indirect costs for payment purposes; provided, that the Contractor pays the contribution to the fund within 30 days after the close of the period covered. Payments made 30 days or more after the close of a period shall not be included until the Contractor actually makes the payment. Accrued costs for such contributions that are paid less often than quarterly shall be excluded from indirect costs for payment purposes until the Contractor actually makes the payment.

(3) Notwithstanding the audit and adjustment of invoices or vouchers under paragraph (g) below, allowable indirect costs under this contract shall be obtained by applying indirect cost rates established in accordance with paragraph (d) below.

(4) Any statements in specifications or other documents incorporated in this contract by reference designating performance of services or furnishing of materials at the Contractor's expense or at no cost to the Government shall be disregarded for purposes of cost-reimbursement under this clause.

(c) Small business concerns. A small business concern may be paid more often than every 2 weeks and may invoice and be paid for recorded costs for items or services purchased directly for the contract, even though the concern has not yet paid for those items or services.

(d) Final indirect cost rates.

(1) Final annual indirect cost rates and the appropriate bases shall be established in accordance with Subpart 42.7 of the Federal Acquisition Regulation (FAR) in effect for the period covered by the indirect cost rate proposal.

(2) The Contractor shall, within 90 days after the expiration of each of its fiscal years, or by a later date approved by the Contracting Officer, submit to the cognizant Contracting Officer responsible for negotiating its final indirect cost rates and, if required by agency procedures, to the cognizant audit activity proposed final indirect cost rates for that period and supporting cost data specifying the contract

and/or subcontract to which the rates apply. The proposed rates shall be based on the contractor's actual cost experience for that period. The appropriate Government representative and Contractor shall establish the final indirect cost rates as promptly as practical after receipt of the Contractor's proposal.

(3) The Contractor and the appropriate Government representative shall execute a written understanding setting forth the final indirect cost rates. The understanding shall specify (i) the agree-upon final annual indirect cost rates, (ii) the bases to which the rates apply, (iii) the periods for which the rates apply, (iv) any specific indirect cost items treated as direct costs in the settlement, and (v) the affected contract and/or subcontract, identifying any with advance agreements or special terms and the applicable rates. The understanding shall not change any monetary ceiling, contract obligation, or specific cost allowance or disallowance provided for in this contract. The understanding is incorporated into this contract upon execution.

(4) Failure by the parties to agree on a final annual indirect cost rate shall be a dispute within the meaning of the Disputes clause.

(e) Billing rates. Until final annual indirect cost rates are established for any period, the Government shall reimburse the Contractor at billing rates established by the Contracting Officer or by an authorized representative (the cognizant auditor), subject to adjustment when the final rates are established. These billing rates--

(1) Shall be the anticipated final rates; and

(2) May be prospectively or retroactively revised by mutual agreement, at either party's request, to prevent substantial overpayment or underpayment.

(f) Quick-closeout procedures. When the Contractor and Contracting Officer agree, the quick-closeout procedures of Subpart 42.7 of the FAR may be used.

(g) Audit. At any time or times before final payment, the Contracting Officer may have the Contractor's invoices or vouchers and statements of cost audited. Any payment may be (1) reduced by amounts found by the Contracting Officer not to constitute allowable costs or (2) adjusted for prior overpayments or underpayments.

(h) Final payment.

(1) The Contractor shall submit a completion invoice or voucher, designated as such, promptly upon completion of the work, but no later than one year (or longer, as the Contracting Officer may approve in writing) from the completion date. Upon approval of that invoice or voucher, and upon the Contractor's compliance with all terms of this contract, the Government shall promptly pay any balance of allowable costs and that part of the fee (if any) not previously paid.

(2) The Contractor shall pay to the Government any refunds, rebates, credits, or other amounts (including interest, if any) accruing to or received by the Contractor or any assignee under this contract, to the extent that those amounts are properly allocable to costs for which the contractor has been reimbursed by the Government. Reasonable expenses incurred by the Contractor for securing refunds, rebates, credits, or other amounts shall be allowable costs if approved by the Contracting Officer. Before final payment under this contract, the Contractor and each assignee whose assignment is in effect at the time of final payment shall execute and deliver--

(i) An assignment to the Government, in form and substance satisfactory to the Contracting Officer, of refunds, rebates, credits, or other amounts (including interest, if any) properly allocable to costs for which the Contractor has been reimbursed by the Government under this contract; and

(ii) A release discharging the Government, its officers, agents, and employees from all liabilities, obligations, and claims arising out of or under this contract, except--

(A) Specified claims stated in exact amounts, or in estimated amounts when the exact amounts are not known;

(B) Claims (including reasonable incidental expenses) based upon liabilities of the Contractor to third parties arising out of the performance of this contract; provided that the claims are not known to the Contractor on the date of the execution of the release, and that the Contractor gives notice of the claims in writing to the Contracting Officer within 6 years following the release date or notice of final payment date, whichever is earlier; and

(C) Claims for reimbursement of costs, including reasonable incidental expenses, incurred by the Contractor under the patent clauses of this contract, excluding, however, any expenses arising from the Contractor's indemnification of the Government against patent liability.

25. FAR 52.216-11 COST CONTRACT--NO FEE (APR 1984)

(a) The Government shall not pay the Contractor a fee for performing this contract.

(b) After payment of 80 percent of the total estimated cost shown in the Schedule, the Contracting Officer may withhold further payment of allowable cost until a reserve is set aside in an amount that the Contracting Officer considers necessary to protect the Government's interest. This reserve shall not exceed one percent of the total estimated cost shown in the Schedule or $100,000, whichever is less.

26. FAR 52.216-12 COST-SHARING CONTRACT--NO FEE (APR 1984)

(a) The Government shall not pay to the Contractor a fee for performing this contract.

(b) After paying 80 percent of the Government's share of the total estimated cost of performance shown in the Schedule, the Contracting Officer may withhold further payment of allowable cost until a reserve is set aside in an amount that the Contracting Officer considers necessary to protect the Government's interest. This reserve shall not exceed one percent of the Government's share of the total estimated cost shown in the Schedule or $100,000, whichever is less.

27. DEAR 952.217-70 ACQUISITION OF REAL PROPERTY (APR 1984)

(a) Notwithstanding any other provision of the contract, the prior approval of the contracting officer shall be obtained when, in performance of this contract, the contractor acquires or proposes to acquire use of real property by:

(1) Purchase, on the Government's behalf or in the contractor's own name, with title eventually vesting in the Government.

(2) Lease, and the Government assumes liability for, or will otherwise pay for the obligation under the lease as a reimbursable contract cost.

(3) Acquisition of temporary interest through easement, license or permit, and the Government funds the entire cost of the temporary interest.

(b) Justification of and execution of any real property acquisitions shall be in accordance and compliance with directions provided by the contracting officer.

(c) The substance of this clause, including this paragraph (c), shall be included in any subcontract occasioned by this contract under which property described in paragraph (a) of this clause shall be acquired.

28. FAR 52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS AND SMALL DISADVANTAGED BUSINESS CONCERNS (FEB 1990)

(a) It is the policy of the United States that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

(c) As used in this contract, the term "small business concern" shall mean a small business as defined pursuant to section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto. The term "small business concern owned and controlled by socially and economically disadvantaged individuals" shall mean a small business concern (1) which is at least 51 percent unconditionally owned by one or more socially and economically disadvantaged individuals; or, in the case of any publicly owned business, at least 51 per centum of the stock of which is unconditionally owned by one or more socially and economically disadvantaged individuals; and (2) whose management and daily business operations are controlled by one or more of such individuals. This term also means a small business concern that is a least 51 percent unconditionally owned by an economically disadvantaged Indian tribe or Native Hawaiian organization, or a publicly owned business having at least 51

percent of its stock unconditionally owned by one of these entities which has its management and daily business controlled by members or an economically disadvantaged Indian tribe or Native Hawaiian Organization, and which meets the requirements or 13CFR 124. The Contractor shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Asian-Indian Americans and other minorities, or any other individual found to be disadvantaged by the Administration pursuant to section 8(a) of the Small Business Act. The Contractor shall presume that socially and economically disadvantaged entities also include Indian Tribes and Native Hawaiian Organizations.

(d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as either a small business concern or a small business concern owned and controlled by socially and economically disadvantaged individuals.

29. DEAR 952.219-9 SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS SUBCONTRACTING PLAN (JAN 1991)

(a) This clause does not apply to small business concerns.

(b) "Commercial product," as used in this clause, means a product in regular production that is sold in substantial quantities to the general public and/or industry at established catalog or market prices. It also means a product which, in the opinion of the Contracting Officer, differs only insignificantly from the Contractor's commercial product.

"Subcontract," as used in this clause, means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) The offeror, upon request by the Contracting Officer, shall submit and negotiate a subcontracting plan, where applicable, which addresses separately subcontracting with small business concerns and small disadvantaged business concerns and which shall be included in and made a part of the resultant contract. The subcontracting plan shall be negotiated within the time specified by the Contracting Officer. Failure to submit and negotiate the subcontracting plan shall make the offeror ineligible for award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business concerns and small disadvantaged business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of--

(i) Total dollars planned to be subcontracted;

(ii) Total dollars planned to be subcontracted to small business concerns; and

(iii) Total dollars planned to be subcontracted to small disadvantaged business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to (i) small business concerns and (ii) small disadvantaged business concerns.

(4) A description of the method used to develop the subcontracting goals in (1) above.

(5) A description of the method used to identify potential sources for solicitation purposes (e.g., existing company source list, the Procurement Automated Source System (PASS) of the Small Business Administration, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small and small disadvantaged business concerns trade associations).

(6) A statement as to whether or not the offeror included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with (i) small business concerns and (ii) small disadvantaged business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that small business concerns and small disadvantaged business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause in this contract entitled "Utilization of Small Business Concerns and Small Disadvantaged Business Concerns" in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) who receive subcontracts in excess of $500,000 ($1,000,000 for construction of any public facility), to adopt a plan similar to the plan agreed to by the offeror.

(10) Assurances that the offeror will (i) cooperate in any studies or surveys as may be required, (ii) submit periodic reports in order to allow the Government to determine the extent of compliance by the offeror with the subcontracting plan, (iii) submit, not later than the 25th day of the succeeding month, Standard Form (SF) 294 only, (DOE contractors need not submit SF 295) on a quarterly basis current as the last day of March, June, September and December, and upon contract completion, in accordance with the instructions on the form except the report shall be submitted quarterly rather than semiannually and additionally shall indicate at the remarks block the number and dollar amount of award made to labor surplus area concerns to the extent such reporting is required by the terms of their contract, and (iv) ensure that its subcontractors agree to submit SF 294 in accordance with the instructions at (iii) above.

(11) A recitation of the types of records the offeror will maintain to demonstrate procedures that have been adopted to comply with the requirements and goals in the plan, including established source lists; and a description of its efforts to locate small and small disadvantaged business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated):

(i) Source lists, guides, and other data that identify small and small disadvantaged business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small or small disadvantaged business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than $100,000, indicating (A) whether small business concerns were solicited and if not, why not, (B) whether small disadvantaged business concerns were solicited and if not, why not, and (C) if applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact (A) trade associations, (B) business development organizations, and (C) conferences and trade fairs to locate small and small disadvantaged business sources.

(v) Records of internal guidance and encouragement provided to buyers through (A) workshops, seminars, training, etc., and (B) monitoring performance to evaluate compliance with the program's requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having company or division-wide annual plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small business and small disadvantaged business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the Contractor's lists of potential small business and small disadvantaged subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small business and small disadvantaged business concerns in all "make-or-buy" decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small and small disadvantaged business firms.

(4) Provide notice to subcontractors concerning penalties and remedies for misrepresentations of business status as small business or small disadvantaged business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.

(f) A master subcontracting plan on a plant or division-wide basis which contains all the elements required by (d) above, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided:

(1) the master plan has been approved,

(2) the offeror provides copies of the approved master plan and evidence of its approval to the Contracting Officer, and

(3) goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g) (1) If a commercial product is offered, the subcontracting plan required by this clause may relate to the offeror's production generally, for both commercial and noncommercial products, rather than solely to the Government contract. In these cases, the offeror shall, with the concurrence of the Contracting Officer, submit one company-wide or division-wide annual plan.

(2) The annual plan shall be reviewed for approval by the agency awarding the offeror its first prime contract requiring a subcontracting plan during the fiscal year, or by an agency satisfactory to the Contracting Officer.

(3) The approval plan shall remain in effect during the offeror's fiscal year for all of the offeror's commercial products.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization of Small Business Concerns and Small Disadvantaged Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.

30. FAR 52.219-13 UTILIZATION OF WOMEN-OWNED SMALL BUSINESSES (AUG 1986)

(a) "Women-owned small businesses," as used in this clause, means small business concerns that are at least 51 percent owned by women who are United States citizens and who also control and operate the business.

"Control," as used in this clause, means exercising the power to make policy decisions.

"Operate," as used in this clause, means being actively involved in the day-to-day management of the business.

"Small business concern," as used in this clause, means a concern including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in 13 CFR 121.

(b) It is the policy of the United States that women-owned small businesses shall have the maximum practicable opportunity to participate in performing contracts awarded by any Federal agency.

(c) The Contractor agrees to use its best efforts to give women-owned small businesses the maximum practicable opportunity to participate in the subcontracts it awards to the fullest extent consistent with the efficient performance of its contract.

(d) The Contractor may rely on written representations by its subcontractors regarding their status as women-owned small businesses.

31. FAR 52.219-16 LIQUIDATED DAMAGES-SMALL BUSINESS SUBCONTRACTING PLAN (AUG 1989)

(a) "Failure to make a good faith effort to comply with the subcontracting plan," as used in this clause, means a willful or intentional failure to perform in accordance with the requirements of the subcontracting plan approved under the clause in this contract entitled "Small Business and Small Disadvantaged Business Subcontracting Plan," or willful or intentional action to frustrate the plan.

(b) If, at contract completion, or in the case of a commercial products plan, at the close of the fiscal year for which the plan is applicable, the Contractor has failed to meet its subcontracting goals and the Contracting Officer decides in accordance with paragraph (c) of this clause that the Contractor failed to make good faith effort to comply with its

subcontracting plan, established in accordance with the clause in this contract entitled Small and Small Disadvantaged Business Subcontracting Plans, the Contractor shall pay the Government liquidated damages in an amount stated. The amount of damages attributable to the Contractor's failure to comply shall be an amount equal to the actual dollar amount by which the Contractor failed to achieve each subcontract goal or, in the case of a commercial products plan, that portion of the dollar amount allocable to Government contracts by which the Contractor failed to achieve each subcontract goal.

(c) Before the Contracting Officer makes a final decision that the Contractor has failed to make such good faith effort, the Contracting Officer shall give the Contractor written notice specifying the failure and permitting the Contractor to demonstrate what good faith efforts have been made. Failure to respond to the notice may be taken as an admission that no valid explanation exists. If, after consideration of all the pertinent data, the Contracting Officer finds that the Contractor failed to make a good faith effort to comply with the subcontracting plan, the Contracting Officer shall issue a final decision to that effect and require that the Contractor pay the Government liquidated damages as provided in paragraph (b) of this clause.

(d) With respect to commercial products plans, i.e., company-wide or division-wide subcontracting plans approved under paragraph (g) of the clause in this contract entitled, Small Business and Small Disadvantaged Business Subcontracting Plan, the Contracting Officer of the agency that originally approved the plan will exercise the functions of the Contracting Officer under this clause on behalf of all agencies that awarded contracts covered by that commercial products plan.

(e) The Contractor shall have the right of appeal, under the clause in this contract entitled Disputes, from any final decision of the Contracting Officer.

(f) Liquidated damages shall be in addition to any other remedies that the Government may leave.

32. FAR 52.220-3 UTILIZATION OF LABOR SURPLUS AREA CONCERNS (APR 1984)

(a) Applicability. This clause is applicable if this contract exceeds the appropriate small purchase limitation in Part 13 of the Federal Acquisition Regulation.

(b) Policy. It is the policy of the Government to award contracts to concerns that agree to perform substantially in Labor Surplus Areas (LSA's) when this can be done consistent with the efficient performance of the contract and at prices no higher

than are obtainable elsewhere. The Contractor agrees to use its best efforts to place subcontracts in accordance with this policy.

(c) Order of preference. In complying with paragraph (b) above and with paragraph (c) of the clause of this contract entitled Utilization of Small Business Concerns and Small Disadvantaged Business Concerns, the Contractor shall observe the following order of preference in awarding subcontracts:

(1) small business concerns that are LSA concerns,

(2) other small business concerns, and

(3) other LSA concerns.

(d) Definitions.

"Labor Surplus Area," as used in this clause, means a geographical area identified by the Department of Labor in accordance with 20 CFR 654, Subpart A, as an area of concentrated unemployment or underemployment or an area of labor surplus.

"Labor surplus area concern," as used in this clause, means a concern that together with its first-tier subcontractors will perform substantially in labor surplus areas. Performance is substantially in labor surplus areas if the costs incurred under the contract on account of manufacturing, production, or performance of appropriate services in labor surplus areas exceed 50 percent of the contract price.

33. FAR 52.220-4 LABOR SURPLUS AREA SUBCONTRACTING PROGRAM (APR 1984)

(a) See the Utilization of Labor Surplus Area Concerns clause of this contract for applicable definitions.

(b) The Contractor agrees to establish and conduct a program to encourage Labor Surplus Area (LSA) concerns to compete for subcontracts within their capabilities when the subcontracts are consistent with the efficient performance of the contract at prices no higher than obtainable elsewhere. The Contractor shall--

(1) Designate a liaison officer who will (i) maintain liaison with authorized representatives of the Government on LSA matters, (ii) supervise compliance with the Utilization of Labor Surplus Area Concerns clause, and (iii) administer the Contractor's labor surplus area subcontracting program;

(2) Provide adequate and timely consideration of the potentialities of LSA concerns in all make-or-buy decisions;

(3) Ensure that LSA concerns have an equitable opportunity to compete for subcontracts, particularly by arranging solicitations, time for the preparation of offers, quantities, specifications, and delivery schedules so as to facilitate the participation of LSA concerns;

(4) Include the Utilization of LSA Concerns clause in subcontracts that offer substantial LSA subcontracting opportunities; and

(5) Maintain records showing (i) the procedures adopted and (ii) the Contractor's performance, to comply with this clause. The records will be kept available for review by the Government until the expiration of 1 year after the award of this contract, or for such longer period as may be required by any other clause of this contract or by applicable law or regulations.

(c) The Contractor further agrees to insert in any related subcontract that may exceed $500,000 and that contains the Utilization of LSA Concerns clause, terms that conform substantially to the language of this clause, including this paragraph (c), and to notify the Contracting Officer of the names of subcontractors.

34. FAR 52.222-1 NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (APR 1984)

(a) If the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this contract, the Contractor shall immediately give notice, including all relevant information, to the Contracting Officer.

(b) The Contractor agrees to insert the substance of this clause, including this paragraph (b), in any subcontract to which a labor dispute may delay the timely performance of this contract; except that each subcontract shall provide that in the event its timely performance is delayed or threatened by delay by any actual or potential labor dispute, the subcontractor shall immediately notify the next higher tier subcontractor or the prime Contractor, as the case may be, of all relevant information concerning the dispute.

35. FAR 52.222-3 CONVICT LABOR (APR 1984)

The Contractor agrees not to employ any person undergoing sentence of imprisonment in performing this contract except as provided by 18 U.S.C. 4082(c)(2) and Executive Order 11755, December 29, 1973.

36. FAR 52.222-26 EQUAL OPPORTUNITY (APR 1984)

(a) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of $10,000, the Contractor shall comply with subparagraphs (b)(1) through (11) below. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(b) During performing this contract, the Contractor agrees as follows:

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.

(2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (i) employment, (ii) upgrading, (iii) demotion, (iv) transfer, (v) recruitment or recruitment advertising, (vi) layoff or termination, (vii) rates of pay or other forms of compensation, and (viii) selection for training, including apprenticeship.

(3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(4) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's

commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. Standard Form 100 (EEO-1), or any successor form, is the prescribed form to be filed within 30 days following the award, unless filed within 12 months preceding the date of award.

(8) The Contractor shall permit access to its books, records, and accounts by the contracting agency or the Office of Federal Contract Compliance Programs (OFCCP) for the purposes of investigation to ascertain the Contractor's compliance with the applicable rules, regulations, and orders.

(9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

(10) The Contractor shall include the terms and conditions of subparagraph (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(11) The Contractor shall take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.

37. FAR 52.222-28 EQUAL OPPORTUNITY PREAWARD CLEARANCE OF SUBCONTRACTS (APR 1984)

Notwithstanding the clause entitled "Subcontractors," the Contractor shall not enter into a first-tier subcontract for an estimated or actual amount of $1 million or more without obtaining in writing from the Contracting Officer a clearance that the proposed subcontractor is in compliance with equal opportunity requirements and therefore is eligible for award.

38. FAR 52.222-35 AFFIRMATIVE ACTION FOR SPECIAL DISABLED AND VIETNAM ERA VETERANS (APR 1984)

(a) Definitions. "Appropriate office of the State employment service system," as used in this clause, means the local office of the Federal-State national system of public employment offices assigned to serve the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, Virgin Islands, American Samoa, and the Trust Territory of the Pacific Islands.

"Openings that the Contractor proposes to fill from within its own organization," as used in this clause, means employment openings for which no one outside the Contractor's organization (including any affiliates, subsidiaries, and the parent companies) will be considered and includes any openings that the Contractor proposes to fill from regularly established "recall" lists.

"Openings that the Contractor proposes to fill under a customary and traditional employer-union hiring arrangement," as used in this clause, means employment openings that the Contractor proposes to fill from union halls, under their customary and traditional employer-union hiring relationship.

"Suitable employment openings," as used in this clause--

(1) Includes, but is not limited to, openings that occur in jobs categorized as--

(i) Production and nonproduction;

(ii) Plant and office;

(iii) Laborers and mechanics;

(iv) Supervisory and nonsupervisory;

(v) Technical; and

(vi) Executive, administrative, and professional positions compensated on a salary basis of less than $25,000 a year; and

(2) Includes full-time employment, temporary employment of over 3 days, and part-time employment, but not openings that the Contractor proposes to fill from within its own organization or under a customary and traditional employer-union hiring arrangement, nor openings in an educational institution that are restricted to students of that institution.

(b) General.

(1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against the individual because the individual is a special disabled or Vietnam Era veteran. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified special disabled and Vietnam Era veterans without discrimination based upon their disability or veterans' status in all employment practices such as--

(i) Employment;

(ii) Upgrading;

(iii) Demotion or transfer;

(iv) Recruitment;

(v) Advertising;

(vi) Layoff or termination;

(vii) Rates of pay or other forms of compensation; and

(viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended.

(c) Listing openings.

(1) The Contractor agrees to list all suitable employment openings existing at contract award or occurring during contract performance, at an appropriate office of the State employment service system in the locality where the opening occurs. These openings include those occurring at any Contractor facility, including one not connected with performing this contract. An independent corporate affiliate is exempt from this requirement.

(2) State and local government agencies holding Federal contracts of $10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service.

(3) The listing of suitable employment openings with the State employment service system is required at least concurrently with using any other recruitment source or effort and involves the obligations of placing a bona fide job order, including accepting referrals of veterans and nonveterans. This listing does not require hiring any particular job applicant or hiring from any particular group of job applicants and is not intended to relieve the Contractor from any requirements of Executive orders or regulations concerning nondiscrimination in employment.

(4) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State employment service system, in each State where it has establishments, of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these terms and has so advised the State system, it need not advise the State system of subsequent contracts. The Contractor may advise the State system when it is no longer bound by this contract clause.

(5) Under the most compelling circumstances, an employment opening may not be suitable for listing, including situations when (i) the Government's needs cannot reasonably be supplied, (ii) listing would be contrary to national security, or (iii) the requirement of listing would not be in the Government's interest.

(d) Applicability.

(1) This clause does not apply to the listing of employment openings which occur and are filled outside the 50 states, the District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, and the Trust Territory of the Pacific Islands.

(2) The terms of paragraph (c) above of this clause do not apply to openings that the Contractor proposes to fill from within its own organization or under a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of its own organization or employer-union arrangement for that opening.

(e) Postings.

(1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified special disabled veterans and veterans of the Vietnam era, and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be in a form prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor (Director), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of the Act, and is committed to take affirmative action to employ, and advance in employment, qualified special disabled and Vietnam Era veterans.

(f) Noncompliance.

If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(g) Subcontracts.

The Contractor shall include the terms of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Director to enforce the terms, including action for noncompliance.

39. FAR 52.222-36 AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS (APR 1984)

(a) General.

(1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against any employee or applicant because of physical or mental handicap. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as--

(i) Employment;

(ii) Upgrading;

(iii) Demotion or transfer;

(iv) Recruitment;

(v) Advertising;

(vi) Layoff or termination;

(vii) Rates of pay or other forms of compensation; and

(viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Rehabilitation Act of 1973 (29 U.S.C. 793) (the Act), as amended.

(b) Postings.

(1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped individuals and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be in a form prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor (Director), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Act and is committed to take affirmative action to employ, and advance in employment, qualified physically and mentally handicapped individuals.

(c) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(d) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of $2,500 unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Director to enforce the terms, including action for noncompliance.

40. FAR 52.222-37 EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (JAN 1988)

(a) The contractor shall report at least annually, as required by the Secretary of Labor, on:

(1) The number of special disabled veterans and the number of veterans of the Vietnam era in the workforce of the contractor by job category and hiring location; and

(2) The total number of new employees hired during the period covered by the report, and of that total, the number of special disabled veterans, and the number of veterans of the Vietnam era.

(b) The above items shall be reported by completing the form entitled "Federal Contractor Veterans' Employment Report VETS-100."

(c) Reports shall be submitted no later than March 31 of each year beginning March 31, 1988.

(d) The employment activity report required by paragraph (a)(2) of this clause shall reflect total hires during the most recent 12-month period as of the ending date selected for the employment profile report required by paragraph (a)(1) of this clause. Contractors may select an ending date: (1) As of the end of any pay period during the period January through March 1st of the year the report is due, or (2) as of December 31, if the

contractor has previous written approval from the Equal Employment Opportunity Commission to do so for purposes of submitting the Employer Information Report EEO-1 (Standard Form 100).

(e) The count of veterans reported according to paragraph (a) of this clause shall be based on voluntary disclosure. Each contractor subject to the reporting requirements at 38 U.S.C. 2012(d) shall invite all special disabled veterans and veterans of the Vietnam era who wish to benefit under the affirmative action program at 38 U.S.C. 2012 to identify themselves to the contractor. The invitation shall state that the information is voluntarily provided, that the information will be kept confidential, that disclosure or refusal to provide the information will not subject the applicant or employee to any adverse treatment and that the information will be used only in accordance with the regulations promulgated under 38 U.S.C. 2012.

(f) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary.

41. FAR 52.222-41 SERVICE CONTRACT ACT OF 1965, AS AMENDED (MAY 1989)

(a) Definitions. "Act," as used in this clause, means the Service Contract Act of 1965, as amended (41. U.S.C. 351, et seq.).

"Contractor," as used in this clause or in any subcontract, shall be deemed to refer to "Government Prime Contractor."

"Service employee," as used in this clause, means any person engaged in the performance of this contract other than any person employed in a bona fide executive, administrative, or professional capacity as these terms are defined in Part 541 of Title 29, Code of Federal Regulations, as revised. It includes all such persons regardless of any contractual relationship that may be alleged to exist between a Contractor or subcontractor and such persons.

(b) Applicability. This contract is subject to the following provisions and to all other applicable provisions of the Act and regulations of the Secretary of Labor (29 CFR Part 4). This clause does not apply to contracts or subcontracts administratively exempted by the Secretary of Labor or exempted by 41 U.S.C. 356, as interpreted in Subpart C of 29 CFR Part 4.

(c) Compensation. (1) Each service employee employed in the performance of this contract by the Contractor or any subcontractor shall be paid not less than the minimum monetary wages and shall be furnished fringe benefits in accordance with the wages and fringe benefits determined by the Secretary of Labor, or authorized representative, as specified in any wage determination attached to this contract.

(2) (i) If a wage determination is attached to this contract, the Contractor shall classify any class of service employee which is not listed therein and which is to be employed under the contract (i.e., the work to be performed is not performed by any classification listed in the wage determination) so as to provide a reasonable relationship (i.e., appropriate level of skill comparison) between such unlisted classifications and the classifications listed in the wage determination. Such conformed class of employees shall be paid the monetary wages and furnished the fringe benefits as are determined pursuant to the procedures in this paragraph (c).

(ii) This conforming procedure shall be initiated by the Contractor prior to the performance of contract work by the unlisted class of employee. The Contractor shall submit Standard Form (SF) 1444, Request for Authorization of Additional Classification and Rate, to the Contracting Officer no later than 30 days after the unlisted class of employee performs any contract work. The Contracting Officer shall review the proposed classification and rate and promptly submit the completed SF 1444 (which must include information regarding the agreement or disagreement of the employees' authorized representatives or the employees' themselves together with the agency recommendation), and all pertinent information to the Wage and Hour Division, Employment Standards Administration U.S. Department of Labor. The Wage and Hour Division will approve, modify, or disapprove the action or render a final determination in the event of disagreement within 30 days of receipt or will notify the Contracting Officer within 30 days of receipt that additional time is necessary.

(iii) The final determination of the conformance action by the Wage and Hour division shall be transmitted to the Contracting Officer who shall promptly notify the Contractor of the action taken. Each affected employee shall be furnished by the Contractor with a written copy of such determination or it shall be posted as a part of the wage determination.

(iv) (A) The process of establishing wage and fringe benefit rates that bear a reasonable relationship to those listed in a wage determination cannot be reduced to any single formula. The approach used may vary from wage determination to wage determination depending on the circumstances. Standard wage

and salary administration practices which rank various job classifications by pay grade pursuant to point schemes or other job factors may, for example, be relied upon. Guidance may also be obtained from the way different jobs are rated under Federal pay systems (Federal Wage Board Pay System and the General Schedule) or from other wage determinations issued in the same locality. Basic to the establishment of any conformable wage rate(s) is the concept that a pay relationship should be maintained between job classifications based on the skill required and the duties performed.

(B) In the case of a contract modification, an exercise of an option or extension of an existing contract, or in any other case where a contractor succeeds a contract under which the classification in question was previously conformed pursuant to paragraph (c) of this clause, a new conformed wage rate and fringe benefits may be assigned to such conformed classification by indexing (i.e., adjusting) the previous conformed rate and fringe benefits by an amount equal to the average (mean) percentage increase (or decrease, where appropriate) between the wages and fringe benefits specified for all classifications to be used on the contract which are listed in the current wage determination, and those specified for the corresponding classifications in the previously applicable wage determination. Where conforming actions are accomplished in accordance with this paragraph prior to the performance of contract work by the unlisted class of employees, the Contractor shall advise the Contracting Officer of the action taken but the other procedures in subdivision (c)(2)(ii) of this clause need not be followed.

(C) No employee engaged in performing work on this contract shall in any event be paid less than the currently applicable minimum wage specified under section 6(a)(1) of the Fair Labor Standards Act of 1938, as amended.

(v) The wage rate and fringe benefits finally determined pursuant to paragraph (c)(2) of this clause shall be paid to all employees performing in the classification from the first day on which contract work is performed by them in the classification. Failure to pay such unlisted employees the compensation agreed upon by the interested parties and/or finally determined by the Wage and Hour Division retroactive to the date such class of employees commenced contract work shall be a violation of the Act and this contract.

(vi) Upon discovery of failure to comply with subparagraph (c) of this clause, the Wage and Hour Division shall make a final determination of conformed classification, wage rate, and/or fringe benefits which shall be retroactive to the date such class of employees commenced contract work.

(3) Adjustment of Compensation. If the term of this contract is more than 1 year, the minimum monetary wages and fringe benefits required to be paid or furnished thereunder to service employees under this contract shall be subject to adjustment after 1 year and not less often than once every 2 years, under wage determinations issued by the Wage and Hour Division.

(d) Obligation to Furnish Fringe Benefits. The contractor or subcontractor may discharge the obligation to furnish fringe benefits specified in the attachment or determined under subparagraph (c)(2) of this clause by furnishing equivalent combinations of bona fide fringe benefits, or by making equivalent or differential cash payments only in accordance with Subpart D of 29 CFR Part 4.

(e) Minimum Wage. In the absence of a minimum wage attachment for this contract, neither the contractor nor any subcontractor under this contract shall pay any person performing work under the contract (regardless of whether the person is a service employee) less than the minimum wage specified by section 6(a)(1) of the Fair Labor Standards Act of 1938. Nothing in this provision shall relieve the contractor or any subcontractor of any other obligation under law or contract for the payment of a higher wage to any employee.

(f) Successor Contracts. If this contract succeeds a contract, subject to the Service Contract Act of 1965 as amended, under which substantially the same services were furnished in the same locality and service employees were paid wages and fringe benefits provided for in a collective bargaining agreement, in the absence of the minimum wage attachment for this contract setting forth such collectively bargained wage rates and fringe benefits, neither the Contractor nor any subcontractor under this contract shall pay any service employee performing any of the contract work (regardless of whether or not such employee was employed under the predecessor contract), less than the wages and fringe benefits provided for in such collective bargaining agreement, to which such employee would have been entitled if employed under the predecessor contract, including accrued wages and fringe benefits and any prospective increases in wages and fringe benefits provided for under such agreement. No Contractor or subcontractor under this contract may be relieved of the foregoing obligation unless the limitations of 29 CFR Part 4.1b(b) apply or unless the Secretary of Labor or the Secretary's authorized representative finds, after a hearing as provided in 29 CFR Part 4.10 that the wages and/or fringe benefits provided for in such agreement are substantially at variance with those which prevail for services of a character similar in the locality, or determines, as provided in 29 CFR Part 4.11, that the collective bargaining agreement applicable to service

employees employed under the predecessor contract was not entered into as a result of arm's-length negotiations. Where it is found in accordance with the review procedures provided in 29 CFR 4.10 and/or 4.11 and Parts 6 and 8 that some or all of the wages and/or fringe benefits contained in a predecessor contractor's collective bargaining agreement are substantially at variance with those which prevail for services of a character similar in the locality, and/or that the collective bargaining agreement applicable to service employees employed under the predecessor contract was not entered into as a result of arm's-length negotiations, the Department will issue a new or revised wage determination setting forth the applicable wage rates and fringe benefits. Such determination shall be made part of the contract or subcontract, in accordance with the decision of the Administrator, the Administrative Law Judge, or the Board of Service Contract Appeals, as the case may be, irrespective of whether such issuance occurs prior to or after the award of a contract or subcontract. 53 Comp. Gen 401(1973). In the case of a wage determination issued solely as a result of a finding of substantial variance, such determination shall be effective as of the date of the final administrative decision.

(g) Notification to Employees. The Contractor and any subcontractor under this contract shall notify each service employee commencing work on this contract of the minimum monetary wage and any fringe benefits required to be paid pursuant to this contract, or shall post the wage determination attached to this contract. The poster provided by the Department of Labor (Publication WH 1313) shall be posted in a prominent and accessible place at the worksite. Failure to comply with this requirement is a violation of Section 2(a)(4) of the Act and of this contract.

(h) Safe and Sanitary Working Conditions. The contractor or subcontractor shall not permit any part of the services called for by this contract to be performed in buildings or surroundings or under working conditions provided by or under the control or supervision of the contractor or subcontractor which are unsanitary or hazardous or dangerous to the health or safety of service employees engaged to furnish these services, and the contractor or subcontractor shall comply with the safety and health standards applied under 29 CFR Part 1925.

(i) Records.

(1) The contractor and each subcontractor performing work subject to the Act shall make and maintain for 3 years from the completion of the work, and make them available for inspection and transcription by authorized representatives of the Wage and Hour Division, Employment Standards Administration, a record of the following:

(i) For each employee subject to the Act--

(A) Name and address and social security number;

(B) Correct work classification or classifications, rate or rates of monetary wages paid and fringe benefits provided, rate or rates of fringe benefits payments in lieu of fringe benefits, and total daily and weekly compensation.

(C) Daily and weekly hours worked by each employee; and

(D) Any deductions, rebates, or refunds from the total daily or weekly compensation of each employee.

(ii) For those classes of services employees not included in any wage determination attached to this contract, wage rates or fringe benefits determined by the interested parties or by the Administrator or authorized representative under the terms of paragraph (c) of this clause. A copy of the report required by subdivision (c)(2)(ii) of this clause will fulfill this requirement.

(iii) Any list of the predecessor Contractor's employees which had been furnished to the Contractor as prescribed by paragraph (n) of this clause.

(2) The contractor shall also make available a copy of this contract for inspection or transcription by authorized representatives of the Wage and Hour Division.

(3) Failure to make and maintain or to make available such records for inspection and transcription shall be a violation of the regulations and this contract, and in the case of failure to produce such records, the contracting officer, upon direction of the Department of Labor and notification of the contractor, shall take action to cause suspension of any further payment or advance of funds until such violation ceases.

(4) The contractor shall permit authorized representatives of the Wage and Hour Division to conduct interviews with employees at the worksite during normal working hours.

(j) Pay Periods. The contractor shall unconditionally pay to each employee subject to the Act all wages due free and clear and without subsequent deduction (except as otherwise provided by law or Regulations, 29 CFR Part 4), rebate, or kickback on any

account. These payments shall be made no later than one pay period following the end of the regular pay period in which such wages were earned or accrued. A pay period under this Act may not be of any duration longer than semi-monthly.

(k) Withholding of Payments and Termination of Contract. The contracting officer shall withhold or cause to be withheld from the Government prime contractor under this or any other Government contract with the prime contractor such sums as an appropriate official of the Department of Labor requests or such sums as the contracting officer decides may be necessary to pay underpaid employees employed by the contractor or subcontractor. In the event of failure to pay any employees subject to the Act all or part of the wages or fringe benefits due under the Act, the agency may, after authorization or by direction of the Department of Labor and written notification to the contractor, take action to cause suspension of any further payment or advance of funds until such violations have ceased. Additionally, any failure to comply with the requirements of these clauses relating to the Service Contract Act of 1965, may be grounds for termination of the right to proceed with the contract work. In such event, the Government may enter into other contracts or arrangements for completion of the work, charging the contractor in default with any additional cost.

(l) Subcontracts. The contractor agrees to insert this clause in all subcontracts subject to the Act.

(m) Collective Bargaining Agreements Applicable to Service Employees. If wages to be paid or fringe benefits to be furnished any service employees employed by the Government Prime Contractor or any subcontractor under the contract are provided for in a collective bargaining agreement which is or will be effective during any period in which the contract is being performed, the Government Prime Contractor shall report such fact to the Contracting Officer, together with full information as to the application and accrual of such wages and fringe benefits, including any prospective increases, to service employees engaged in work on the contract, and a copy of the collective bargaining agreement. Such report shall be made upon commencing performance of the contract, in the case of collective bargaining agreements effective at such time, and in the case of such agreements or provisions or amendments thereof effective at a later time during the period of contract performance, such agreements shall be reported promptly after negotiation thereof.

(n) Seniority List. Not less than 10 days prior to completion of any contract being performed at a Federal facility where service employees may be retained in the performance of the succeeding contract and subject to a wage determination which contains vacation or other benefit provisions based upon length

of service with a contractor (predecessor) or successor (29 CFR 4.173), the incumbent Prime Contractor shall furnish to the Contracting Officer a certified list of the names of all service employees on the contractor's or subcontractor's payroll during the last month of contract performance. Such list shall also contain anniversary dates of employment on the contract either with the current or predecessor contractors of each such service employee. The contracting officer shall turn over such list to the successor contractor at the commencement of the succeeding contract.

(o) Rulings and Interpretations. Rulings and interpretations of the Service Contract Act of 1965, as amended, are contained in Regulations, 29 CFR Part 4.

(p) Contractor's Certification.

(1) By entering into this contract, the Contractor (and officials thereof) certifies that neither it (nor he or she) nor any person or firm who has a substantial interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of the sanctions imposed pursuant to Section 5 of the Act.

(2) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract pursuant to Section 5 of the Act.

(3) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

(q) Variations, Tolerances, and Exemptions Involving Employment. Notwithstanding any of the clauses in paragraphs (b) through (o) of this clause relating to the Service Contract Act of 1965, the following employees may be employed in accordance with the following variations, tolerances, and exemptions, which the Secretary of Labor, pursuant to Section 4(b) of the Act prior to its amendment by Public Law 92-473, found to be necessary and proper in the public interest or to avoid serious impairment of the conduct of Government business:

(1) Apprentices, student-learners, and workers whose earning capacity is impaired by age, physical, or mental deficiency or injury may be employed at wages lower than the minimum wages otherwise required by Section 2(a)(1) or 2(b)(1) of the Service Contract Act without diminishing any fringe benefits or cash payments in lieu thereof required under Section 2(a)(2) of that Act, in accordance with the conditions and procedures prescribed for the employment of apprentices, student-learners,

handicapped persons, and handicapped clients of sheltered workshops under Section 14 of the Fair Labor Standards Act of 1938, in the regulations issued by the Administrator (29 CFR Parts 520, 521, 524 and 525).

(2) The Administrator will issue certificates under the Act for the employment of apprentices, student-learners, handicapped persons, or handicapped clients of sheltered workshops not subject to the Fair Labor Standards Act of 1938, or subject to different minimum rates of pay under the two acts, authorizing appropriate rates of minimum wages (but without changing requirements concerning fringe benefits or supplementary cash payments in lieu thereof), applying procedures prescribed by the applicable regulations issued under the Fair Labor Standards Act of 1938 (29 CFR Parts 520, 521, 524 and 525).

(3) The Administrator will also withdraw, annul, or cancel such certificates in accordance with the regulations in 29 CFR Parts 525 and 528.

(r) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed and individually registered in a bona fide apprenticeship program registered with a State Apprenticeship Agency which is recognized by the U. S. Department of Labor, or if no such recognized agency exists in a State, under a program registered with the Bureau of Apprenticeship and Training, Employment and Training Administration, U. S. Department of Labor. Any employee who is not registered as an apprentice in an approved program shall be paid the wage rate and fringe benefits contained in the applicable wage determination for the journeyman classification of work actually performed. The wage rates paid apprentices shall not be less than the wage rate for their level of progress set forth in the registered program, expressed as the appropriate percentage of the journeyman's rate contained in the applicable wage determination. The allowable ratio of apprentices to journeymen employed on the contract work in any craft classification shall not be greater than the ratio permitted to the contractor as to his entire work force under the registered program.

(s) Tips. An employee engaged in an occupation in which he or she customarily and regularly receives more than $30 a month in tips may have the amount of tips credited by the employer against the minimum wage required by Section 2(a)(i) or Section 2(b)(1) of the Act in accordance with Section 3(m) of the Fair Labor Standards Act and Regulations, 29 CFR Part 531: Provided, however, that the amount of such credit may not exceed $1.34 per hour beginning January 1, 1981. To use this provision:

(1) The employer must inform tipped employees about this tip credit allowance before the credit is utilized;

(2) The employees must be allowed to retain all tips (individually or through a pooling arrangement and regardless of whether the employer elects to take a credit for tips received);

(3) The employer must be able to show by records that the employee receives at least the applicable Service Contract Act minimum wage through the combination of direct wages and tip credit; and

(4) The use of such tip credit must have been permitted under any predecessor collective bargaining agreement applicable by virtue of Section 4(c) of the Act.

(t) Disputes Concerning Labor Standards. The U.S. Department of Labor has set forth in 29 CFR Parts 4, 6, and 8 procedures for resolving disputes concerning labor standards requirements. Such disputes shall be resolved in accordance with those procedures and not the Disputes clause of this contact. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

42. FAR 52.222-42 STATEMENT OF EQUIVALENT RATES FOR FEDERAL HIRES (MAY 1989)

In compliance with the Service Contract Act of 1965, as amended, and the regulations of the Secretary of Labor (29 CFR Part 4), this clause identifies the classes of service employees expected to be employed under the contract and states the wages and fringe benefits payable to each if they were employed by the contracting agency subject to the provisions of 5 U.S.C. 5341 or 5332.

This Statement is for Information Only: It is Not a Wage Determination

Employee class	Monetary wage--Fringe benefits
Supervisory Firefighters/GS-081-7 (Station Chief)	22,214/yr.*
Lead Firefighter/GS-081-5	19,992/yr.*
Firefighter/GS-081-5	17.937/yr.*
Firefighter (Trainee II)/GS-081-4	16,031/yr.*
Firefighter (Trainee I)/GS-081-3	14,281/yr.*
Secretary/GS-318-4	16,031/yr.*

*Fringe Benefits:

FDC-E

Annual Leave. Employees earn vacation or "annual" leave. The amount earned caries with the length of Federal Service. Employees earn 13 days of annual leave each year the first three years of employment, 20 days per year for 3 to 15 years. Under certain conditions, time spent in the military service is creditable towards leave earnings rates for annual leave.

Sick Leave. Regardless of the length of service employees earn 13 days of sick leave each year. Sick leave not used accumulates year after year and protects employees from loss and salary due to an extended illness. Accumulated sick leave also enhances retirement benefits.

Health Insurance. Employees can enroll in one of a variety of health plans. Regardless of the plan selected, employees and the Government contribute to the plan.

Life Insurance. Federal employees are eligible for basic life insurance and may select optional life insurance. This coverage will be based on their annual salary and will include payments for loss of limbs and/or eyesight in addition to accidental death.

Retirement. A bill creating a new retirement plan has recently been signed into law for Federal employees hired since January 1, 1987, and provides Social Security benefits earned through Federal employment; a modified retirement plan for which employees will pay 1.3 percent of their salary; and an optional, tax-deferred thrift savings plan with government-matching contributions.

43. FAR 52.223-2 CLEAN AIR AND WATER (APR 1984)

NOTE: This clause applies to this contract only if the price is (a) in excess of $100,000; (b) a facility to be used has been the subject of a conviction under the applicable portion of the Air Act (42 U.S.C. 7413(c)(1)) or the Water Act (33 U.S.C. 1319(c)) and is listed by EPA as a violating facility; or (c) the acquisition is not exempt under FAR 23.104.

(a) "Air Act," as used in this clause, means the Clean Air Act (42 U.S.C. 7401 et seq.).

"Clean air standards," as used in this clause, means--

(1) Any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, work practices, or other requirements contained in, issued under, or otherwise adopted under the Air Act or Executive Order 11738;

(2) An applicable implementation plan as described in section 110(d) of the Air Act (42 U.S.C. 7410(d));

(3) An approved implementation procedure or plan under section 111(c) or section 111(d) of the Air Act (42 U.S.C. 7411(c) or (d)); or

(4) An approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 7412(d)).

"Clean water standards," as used in this clause, means any enforceable limitation, control, condition, prohibition, standard, or other requirement promulgated under the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by local government to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. 1317).

"Compliance," as used in this clause, means compliance with--

(1) Clean air or water standards; or

(2) A schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency, or an air or water pollution control agency under the requirements of the Air Act or Water Act and related regulations.

"Facility," as used in this clause, means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a Contractor or subcontractor, used in the performance of a contract or subcontract. When a location or site of operations includes more than one building, plant, installation, or structure, the entire location or site shall be deemed a facility except when the Administrator, or a designee, of the Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

"Water Act," as used in this clause, means Clean Water Act (33 U.S.C. 1251 et seq.).

(b) The Contractor agrees--

(1) To comply with all the requirements of section 114 of the Clean Air Act (42 U.S.C. 7414) and section 308 of the Clean Water Act (33 U.S.C. 1318) relating to inspection, monitoring, entry, reports, and information, as well as other

requirements specified in section 114 and section 308 of the Air Act and the Water Act, and all regulations and guidelines issued to implement those acts before the award of this contract;

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the Environmental Protection Agency List of Violating Facilities on the date when this contract was awarded unless and until the EPA eliminates the name of the facility from the listing;

(3) To use best efforts to comply with clean air standards and clean water standards at the facility in which the contract is being performed; and

(4) To insert the substance of this clause into any nonexempt subcontract, including this subparagraph (b)(4).

44. FAR 52.223-3 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA (DEC 1989) DELETE

(a) The Contractor agrees to submit a Material Safety Data Sheet (Department of Labor Form OSHA-20), as prescribed in Federal Standard No. 313B, for all hazardous materials 5 days before delivery of the material, whether or not listed in Appendix A of the Standard. This obligation applies to all materials delivered under this contract which will involve exposure to hazardous materials or items containing these materials.

(b) "Hazardous material," as used in this clause, is as defined in Federal Standard No. 313B, in effect on the date of this contract.

DELETE

(c) Neither the requirements of this clause nor any act or failure to act by Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

(d) Nothing contained in this clause shall relieve the Contractor from complying with applicable Federal, state and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

(e) The Government's rights in data furnished under this contract with respect to hazardous material are as follows:

(1) To use, duplicate, and disclose any data to which this clause is applicable. The purposes of this right are to (i) apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of

hazardous materials; (ii) obtain medical treatment for those affected by the material; and (iii) have others use, duplicate, and disclose the data for the Government for these purposes.

(2) To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph (e)(1) above, in precedence over any other clause of this contract providing for rights in data.

(3) That the Government is not precluded from using similar or identical data acquired from other sources.

(4) That the data shall not be duplicated, disclosed, or released outside the Government, in whole or in part for any acquisition or manufacturing purpose, if the following legend is marked on each piece of data to which this clause applies--

"This is furnished under United States Government Contract No. ..... and shall not be used, duplicated, or disclosed for any acquisition or manufacturing purpose without the permission of..... This legend shall be marked on any reproduction of this data."

(5) That the Contractor shall not place the legend or any other restrictive legend on any data which (i) the Contractor or any subcontractor previously delivered to the Government without limitations or (ii) should be delivered without limitations under the conditions specified in the Federal Acquisition Regulation in the clause at 52.227-14, Rights in Data.

(f) The Contractor shall insert this clause, including this paragraph (f), with appropriate changes in the designation of the parties, in subcontracts at any tier (including purchase designations or purchase orders) under this contract involving hazardous material.

45. FAR 52.223-6 DRUG-FREE WORKPLACE (JUL 1990)

(a) Definitions. As used in this clause,

"Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812) and as further defined in regulation at 21 CFR 1308.11 - 1308.15.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes.

DELETE

"Criminal drug statute" means the Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession or use of any controlled substance.

"Drug-free workplace" means a site(s) for the performance of work done by the Contractor in connection with a specific contract at which employees of the contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a Contractor directly engaged in the performance of work under a Government contract.

"Directly engaged" is defined to include all direct cost employees and any other Contractor employee who has other than a minimal impact or involvement in contract performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

(b) The Contractor, if other than an individual, shall--within 30 calendar days after award (unless a longer period is agreed to in writing for contracts of 30 calendar days or more performance duration); or as soon as possible for contracts of less than 30 calendar days performance duration--

(1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

(2) Establish an ongoing drug-free awareness program to inform such employees about--

(i) The dangers of drug abuse in the workplace;

(ii) The contractor's policy of maintaining a drug-free workplace;

(iii) Any available drug counseling, rehabilitation, and employee assistance programs; and

(iv) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

(3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this clause;

(4) Notify such employees in writing in the statement required by subparagraph (b)(1) of this clause that, as a condition of continued employment of this contract, the employee will--

(i) Abide by the terms of the statement; and

(ii) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than five (5) calendar days after such conviction.

(5) Notify the Contracting Officer in writing within 10 calendar days after receiving notice under subdivision (b)(4)(ii) of this clause, from an employee or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;

(6) Within 30 calendar days after receiving notice under subdivision (b)(4)(ii) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of drug abuse violations occurring in the workplace:

(i) Taking appropriate personnel action against such employee, up to and including termination; or

(ii) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1) though (b)(6) of this clause.

(c) The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in the performance of this contract.

(d) In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of paragraphs (b) or (c) of this clause may, pursuant to FAR 23.506, render the contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

DELETE

46. DEAR 952.223-75 PRESERVATION OF INDIVIDUAL OCCUPATIONAL RADIATION EXPOSURE RECORDS (APR 1984)

Individual occupational radiation exposure records generated in the performance of work under this contract shall be subject to inspection by DOE and shall be preserved by the Contractor until disposal is authorized by DOE or at the option of the Contractor delivered to DOE upon completion or termination of the contract. If the Contractor exercises the foregoing option, title to such records shall vest in DOE upon delivery.

47. FAR 52.224-1 PRIVACY ACT NOTIFICATION (APR 1984)

The Contractor will be required to design, develop, or operate a system of records on individuals, to accomplish an agency function subject to the Privacy Act of 1974, Public Law 93-579, December 31, 1974 (5 U.S.C. 552a) and applicable agency regulations. Violation of the Act may involve the imposition of criminal penalties.

48. FAR 52.224-2 PRIVACY ACT (APR 1984)

(a) The Contractor agrees to-

(1) Comply with the Privacy Act of 1974 (the Act) and the agency rules and regulations issued under the Act in the design, development, or operation of any system of records on individuals to accomplish an agency function when the contract specifically identifies-

(i) The systems of records; and

(ii) The design, development, or operation work that the Contractor is to perform;

(2) Include the Privacy Act notification contained in this contract in every solicitation and resulting subcontract and in every subcontract awarded without a solicitation, when the work statement in the proposed subcontract requires the design, development, or operation of a system of records on individuals that is subject to the Act; and

(3) Include this clause, including this subparagraph (3), in all subcontracts awarded under this contract which requires the design, development, or operation of such a system of records.

(b) In the event of violations of the Act, a civil action may be brought against the agency involved when the violation concerns the design, development, or operation of a system of records on individuals to accomplish an agency function, and

criminal penalties may be imposed upon the officers or employees of the agency when the violation concerns the operation of a system of records on individuals to accomplish an agency function. For purposes of the Act, when the contract is for the operation of a system of records on individuals to accomplish an agency function, the Contractor and any employee of the Contractor is considered to be an employee of the agency.

(c) (1) "Operation of a system of records," as used in this clause, means performance of any of the activities associated with maintaining the system of records, including the collection, use, and dissemination of records.

(2) "Record," as used in this clause, means any item, collection, or grouping of information about an individual that is maintained by an agency, including, but not limited to, education, financial transactions, medical history, and criminal or employment history and that contains the person's name, or the identifying number, symbol, or other identifying particular assigned to the individual, such as a fingerprint or voiceprint or a photograph.

(3) "System of records on individuals," as used in this clause means a group of any records under the control of any agency from which information is retrieved by the name of the individual or by some identifying number, symbol, or other identifying particular assigned to the individual.

49. DEAR 952.224-70 PAPERWORK REDUCTION ACT (APR 1984)

(a) In the event that it subsequently becomes a contractual requirement to collect or record information calling either for answer to identical questions from 10 or more persons other than Federal employees, or information from Federal employees which is to be used for statistical compilations of general public interest, the Federal Reports Act will apply to this contract. No plan, questionnaire, interview guide, or other similar device for collecting information (whether repetitive or single-time) may be used without first obtaining clearance from the Office of Management and Budget (OMB).

(b) The contractor shall request the required OMB clearance from the contracting officer before expending any funds or making public contacts for the collection of data. The authority to expend funds and to proceed with the collection of data shall be in writing by the Contracting Officer. The Contractor must plan at least 90 days for OMB clearance. Excessive delay caused by the Government which arises out of

causes beyond the control and without the fault or negligence of the contractor will be considered in accordance with the clause entitled "Excusable Delays," if such clause is applicable. If not, the period of performance may be extended pursuant to this clause if approved by the Contracting Officer.

50. FAR 52.225-3 BUY AMERICAN ACT--SUPPLIES (JAN 1989)

(a) The Buy American Act (41 U.S.C. 10) provides that the Government give preference to domestic end products.

"Components," as used in this clause, means those articles, materials, and supplies incorporated directly into the end products.

"Domestic end product," as used in this clause, means (1) an unmanufactured end product mined or produced in the United States, or (2) an end product manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind as the products referred to in subparagraphs (b)(2) or (3) of this clause shall be treated as domestic. Scrap generated, collected, and prepared for processing in the United States is considered domestic. On acquisitions above $25,000 in value, components of Canadian origin are treated as domestic.

"End products," as used in this clause, means those articles, materials, and supplies to be acquired for public use under this contract.

(b) The Contractor shall deliver only domestic end products, except those--

(1) For use outside the United States;

(2) That the Government determines are not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality;

(3) For which the agency determines that domestic preference would be inconsistent with the public interest: or;

(4) For which the agency determines the cost to be unreasonable (see section 25.105 of the Federal Acquisition Regulation).

(The foregoing requirements are administered in accordance with Executive Order No. 10582, dated December 17, 1954, as amended, and Subpart 25.1 of the Federal Acquisition Regulation.)

51. FAR 52.225-13 RESTRICTIONS ON CONTRACTING WITH SANCTIONED PERSONS (MAY 1989) DELETE

(a) Definitions.

(1) "Component part," means any article which is not usable for its intended functions without being imbedded or integrated into any other product and which, if used in production of a finished product, would be substantially transformed in that process.

(2) "Finished product," means any article which is usable for its intended function without being imbedded in, or integrated into, any other product. It does not include an article produced by a person, other than a sanctioned person, that contains parts or components of the sanctioned person if the parts or components have been substantially transformed during production of the finished product.

(3) "Sanctioned person," means a company or other foreign person upon whom prohibitions have been imposed.

(4) "Substantially transformed," when referring to a component part or finished product, means that the part or product has been subjected to a substantial manufacturing or processing operation by which the part or product is converted or combined into a new and different article of commerce having a new name, character, and use.

(b) General. Section 2443 of the Multilateral Export Control Enhancement Amendments Act (Pub L. 100-418) and Executive Order 12661, effective December 28, 1988, impose, for a period of 3 years, with certain exceptions, a prohibition on contracting with, or procuring (including rental and lease/purchase) directly or indirectly the products or services of (1) Toshiba Machine Company, (2) Kongsberg Trading Company, (3) Toshiba Corporation, or (4) Kongsberg Vaapenfabrikk. The Act and Executive Order also prohibit, for the same 3-year period, the importation into the United States of all products produced by Toshiba Machine Company and Kongsberg Trading Company. These prohibitions also apply to subsidiaries, successor entities or joint ventures of Toshiba Machine Company or Kongsberg Trading Company.

(c) Restriction. Unless listed by the Contractor in its offer, in the solicitation provision at FAR 52.225-12 Notice of Restrictions on Contracting with Sanctioned Persons, or unless one of the exceptions in paragraph (d) of this clause applies, the Contractor agrees that no products or services delivered to the Government under this contract will be products or services of a sanctioned person.

(d) Exceptions. The restrictions Do Not apply--

(1) To finished products of nonsanctioned persons containing components of a sanctioned person if these components have been substantially transformed during the manufacture of the finished product.

(2) To products or services of a sanctioned person provided-

(i) The products are designed to the specifications of a nonsanctioned person marketed under the trademark, brand or name of the nonsanctioned person;

(ii) The business relationship between the nonsanctioned person and the sanctioned person clearly existed prior to June 30, 1987; and

(iii) The nonsanctioned person is not directly or indirectly owned by a sanctioned person.

(3) If a determination has been made in accordance with FAR 25.1003 (a) or (b).

(e) Award. Award of any contract resulting from this solicitation will not affect the Contractor's obligation to comply with importation regulations of the Secretary of the Treasury.

52. FAR 52.227-1 AUTHORIZATION AND CONSENT (APR 1984)

(a) The Government authorizes and consents to all use and manufacture, in performing this contract or any subcontract at any tier, of any invention described in and covered by United States patent (1) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or (2) used in machinery, tools, or methods whose use necessary results from compliance by the Contractor or a subcontractor with (i) specifications or written provisions forming a part of this contract or (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the indemnity clause, if any, included in this contract or any subcontract hereunder (including any lower-tier subcontract), and the Government assumes liability for all other infringements to the extent of the authorization and consent hereinabove granted.

(b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed $25,000; however, omission of this clause from any subcontract, under or over $25,000, does not affect this authorization and consent.

53. FAR 52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (APR 1984)

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice of claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

(c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models, samples, or design or testing services) expected to exceed the dollar amount set forth in 13.000 of the Federal Acquisition Regulation (FAR).

54. FAR 52.228-7 INSURANCE-LIABILITY TO THIRD PERSONS (APR 1984)

(a) (1) Except as provided in subparagraph (2) immediately following, or in paragraph (h) of this clause (if the clause has a paragraph (h)), the Contractor shall provide and maintain workers' compensation, employer's liability, comprehensive general liability (bodily injury), comprehensive automobile liability (bodily injury and property damage) insurance, and such other insurance as the Contracting Officer may require under this contract.

(2) The Contractor may, with the approval of the Contracting Officer, maintain a self-insurance program; provided that, with respect to workers' compensation, the Contractor is qualified pursuant to statutory authority.

(3) All insurance required by this paragraph shall be in a form and amount and for those periods as the Contracting Officer may require or approve and with insurers approved by the Contracting Officer.

(b) The Contractor agrees to submit for the Contracting Officer's approval, to the extent and in the manner required by the Contracting Officer, any other insurance that is maintained by the Contractor in connection with the performance of this contract and for which the Contractor seeks reimbursement.

(c) Except as provided in paragraph (h) of this clause (if the clause has a paragraph (h)), the Contractor shall be reimbursed--

(1) For that portion (i) of the reasonable cost of insurance allocable to this contract and (ii) required or approved under this clause; and

(2) For certain liabilities (and expenses incidental to such liabilities) to third persons not compensated by insurance or otherwise without regard to and as an exception to the limitation of cost or the limitation of funds clause of this contract. These liabilities must arise out of the performance of this contract, whether or not caused by the negligence of the Contractor or of the Contractor's agents, servants, or employees, and must be represented by final judgments or settlements approved in writing by the Government. These liabilities are for--

(i) Loss of or damage to property (other than property owned, occupied, or used by the Contractor, rented to the Contractor, or in the care, custody, or control of the Contractor); or

(ii) Death or bodily injury.

(d) The Government's liability under paragraph (c) of this clause is subject to the availability of appropriated funds at the time a contingency occurs. Nothing in this contract shall be construed as implying that the Congress will, at a later date, appropriate funds sufficient to meet deficiencies.

(e) The Contractor shall not be reimbursed for liabilities (and expenses incidental to such liabilities)--

(1) For which the Contractor is otherwise responsible under the express terms of any clause specified in the Schedule or elsewhere in the contract;

(2) For which the Contractor has failed to insure or to maintain insurance as required by the Contracting Officer; or

(3) That result from willful misconduct or lack of good faith on the part of any of the Contractor's directors, officers, managers, superintendents, or other representatives who have supervision or direction of--

(i) All or substantially all of the Contractor's business;

(ii) All or substantially all of the Contractor's operations at any one plant or separate location in which this contract is being performed; or

(iii) A separate and complete major industrial operation in connection with the performance of this contract.

(f) The provisions of paragraph (e) of this clause shall not restrict the right of the Contractor to be reimbursed for the cost of insurance maintained by the Contractor in connection with the performance of this contract, other than insurance required in accordance with this clause; provided, that such cost is allowable under the Allowable Cost and Payment clause of this contract.

(g) If any suit or action is filed or any claim is made against the Contractor, the cost and expense of which may be reimbursable to the Contractor under this contract, and the risk of which is then uninsured or is insured for less than the amount claimed, the Contractor shall--

(1) Immediately notify the Contracting Officer and promptly furnish copies of all pertinent papers received;

(2) Authorize Government representatives to collaborate with counsel for the insurance carrier in settling or defending the claim when the amount of the liability claimed exceeds the amount of coverage; and

(3) Authorize Government representatives to settle or defend the claim and to represent the Contractor in or to take charge of any litigation, if required by the Government, when the liability is not insured or covered by bond. The Contractor may, at its own expense, be associated with the Government representatives in any such claim or litigation.

55. FAR 52.229-10 STATE OF NEW MEXICO GROSS RECEIPTS AND COMPENSATING TAX (OCT 1988)

(a) Within thirty (30) days after award of this contract, the Contractor shall advise the State of New Mexico of this contract by registering with the State of New Mexico, Taxation and Revenue Department, Revenue Division, pursuant to the Tax Administration Act of the State of New Mexico and shall identify the contract number.

(b) The Contractor shall pay the New Mexico gross receipts taxes, pursuant to the Gross Receipts and Compensating Tax Act of New Mexico, assessed against the contract fee and costs paid for performance of this contract, or of any part or portion thereof, within the State of New Mexico. The allowability of any gross receipts taxes or local option taxes lawfully paid to the State of New Mexico by the Contractor or its subcontractors will be determined in accordance with the Allowable Cost and Payment clause of this contract except as provided in paragraph (d) of this clause.

(c) The Contractor shall submit applications for Nontaxable Transaction Certificates, Form CSR-3C, to the State of New Mexico Taxation and Revenue Department, Revenue Division, P.O. Box 630, Santa Fe, New Mexico 87509. When the Type 15 Nontaxable Transaction Certificate is issued by the Revenue Division, the Contractor shall use these certificates strictly in accordance with this contract, and the agreement between the U. S. Department of Energy and the New Mexico Taxation and Revenue Department.

(d) The Contractor shall provide Type 15 Nontaxable Transaction Certificates to each vendor in New Mexico selling tangible personal property to the contractor for use in the performance of this contract. Failure to provide a Type 15 Nontaxable Transaction Certificate to vendors will result in the vendor's liability for the gross receipt taxes and those taxes, which are then passed on to the Contractor, shall not be reimbursable as an allowable cost by the Government.

(e) The Contractor shall pay the New Mexico compensating user tax for any tangible personal property which is purchased pursuant to a Nontaxable Transaction Certificate if such property is not used for Federal purposes.

(f) Out-of-state purchase of tangible personal property by the Contractor which would be otherwise subject to compensation tax shall be governed by the principles of this clause. Accordingly, compensating tax shall be due from the contractor only if such property is not used for Federal purposes.

(g) The U. S. Department of Energy may receive information regarding the Contractor from the Revenue Division of the New Mexico Taxation and Revenue Department and, at the discretion of the U. S. Department of Energy, may participate in any matters or proceedings pertaining to this clause or the above-mentioned Agreement. This shall not preclude the Contractor from having its own representative nor does it obligate the U. S. Department of Energy to represent its Contractor.

(h) The Contractor agrees to insert the substance of this clause, including this paragraph (h), in each subcontract which meets the criteria in 29.401-6(b)(1) through (3) of the Federal Acquisition Regulation, 48 CFR Part 29.

(i) Paragraphs (a) through (h) of this clause shall be null and void should the Agreement referred to in paragraph (c) of this clause be terminated; provided, however, that such termination shall not nullify obligations already incurred prior to the date of the termination.

56. FAR 52.230-3 COST ACCOUNTING STANDARDS (SEP 1987) DELETE

(a) Unless the contract is exempt under FAR 30.201-1 and 30.201-2, the provisions of Federal Acquisition Regulation (FAR) Subpart 30.3 are incorporated herein by reference and the Contractor, in connection with this contract, shall--

(1) (National Defense Contracts Only) By submission of a Disclosure Statement, disclose in writing the Contractor's cost accounting practices as required by FAR 30.202-1 through 30.202-5. The practices disclosed for this contract shall be the same as the practices currently disclosed and applied on all other contracts and subcontracts being performed by the Contractor and which contain a Cost Accounting Standards (CAS) clause. If the Contractor has notified the Contracting Officer that the Disclosure Statement contains trade secrets and commercial or financial information which is privileged and confidential, the Disclosure Statement shall be protected and shall not be released outside of the Government.

(2) Follow consistently the Contractor's cost accounting practices in accumulating and reporting contract performance cost data concerning this contract. If any change in cost accounting practices is made for the purposes of any contract or subcontract subject to CAS requirements, the change must be applied prospectively to this contract and the Disclosure Statement must be amended accordingly. If the contract price or cost allowance of this contract is affected by such changes, adjustment shall be made in accordance with subparagraph (a)(4) or (a)(5) of this clause, as appropriate.

(3) Comply with all CAS, including any modifications and interpretations indicated thereto contained in FAR Subpart 30.4, in effect on the date of award of this contract or, if the Contractor has submitted cost or pricing data, on the date of final agreement on price as shown on the Contractor's signed certificate of current cost or pricing data. The Contractor shall also comply with any CAS (or modifications to CAS) which hereafter become applicable to a contract or subcontract of the Contractor. Such compliance shall be required prospectively from the date of applicability to such contract or subcontract.

(4) (i) Agree to an equitable adjustment as provided in the Changes clause of this contract if the contract cost is affected by a change which, pursuant to subparagraph (a)(3) of this clause, the Contractor is required to make to the Contractor's established cost accounting practices.

(ii) Negotiate with the Contracting Officer to determine the terms and conditions under which a change may be made to a cost accounting practice, other than a change made under other provisions of subparagraph (a)(4) of this clause; provided that no agreement may be made under this provision that will increase costs paid by the United States.

(iii) When the parties agree to a change to a cost accounting practice, other than a change under subdivision (a)(4)(i) of this clause, negotiate an equitable adjustment as provided in the Changes clause of this contract.

(5) Agree to an adjustment of the contract price or cost allowance, as appropriate, if the Contractor or a subcontractor fails to comply with an applicable Cost Accounting Standard, or to follow any cost accounting practice consistently and such failure results in any increased costs paid by the United States. Such adjustment shall provide for recovery of the increased costs to the United States, together with interest thereon computed at the rate determined by the Secretary of the Treasury pursuant to Pub. L. 92-41, 85 Stat. 97, from the time the payment by the United States was made to the time the adjustment is effected.

(b) If the parties fail to agree whether the Contractor or a subcontractor has complied with an applicable CAS in FAR Subpart 30.4 or a CAS rule or regulation in FAR Subpart 30.3 and as to any cost adjustment demanded by the United States, such failure to agree shall be a dispute concerning a question of fact within the meaning of the Disputes clause of this contract.

(c) The Contractor shall permit any authorized representatives of the Government to examine and make copies of any documents, papers, or records relating to compliance with the requirements of this clause.

(d) The Contractor shall include in all negotiated subcontracts which the Contractor enters into, the substance of this clause, except paragraph (b), and shall require such inclusion in all other subcontracts, of any tier, including the obligation to comply with all CAS in effect on the subcontract's award data, on the date of final agreement on price as shown on the subcontractor's signed Certificate of Current Cost or Pricing Data. This requirement shall apply only to negotiated subcontracts in excess of $100,000 where the price negotiated is not based on--

(1) Established catalog or market prices of commercial items sold in substantial quantities to the general public; or

(2) Prices set by law or regulation, and except that the requirement shall not apply to negotiated subcontracts otherwise exempt from the requirement to include a CAS clause as specified in FAR 30.201-1.

Note (1): New or modified CAS shall be applicable to both national defense and nondefense CAS-covered contracts upon award of a new national defense CAS-covered contract containing the new or modified Standard. The award of a new nondefense CAS-covered contract shall not trigger application of new CAS or modification to CAS.

Note (2): Subcontractors shall be required to submit their Disclosure Statements to the Contractor. However, if a subcontractor has previously submitted its Disclosure Statement to a Government Administrative Contracting Officer (ACO), it may satisfy that requirement by certifying to the Contractor the date of the Statement and the address of the ACO.

DELETE

Note (3): In any case where a subcontractor determines that the Disclosure Statement information is privileged and confidential and declines to provide it to the Contractor or higher tier subcontractor, the Contractor may authorize direct submission of that subcontractor's Disclosure Statement to the same Government offices to which the Contractor was required to make submission of its Disclosure Statement. Such authorization shall in no way relieve the Contractor of liability as provided in subparagraph (a)(5) of this clause. In view of the foregoing and since the contract may be subject to adjustment under this clause by reason of any failure to comply with rules, regulations, and Standards as specified in FAR Subparts 30.3 and 30.4 in connection with covered subcontracts, it is expected that the Contractor may wish to include a clause in each such subcontract requiring the subcontractor to appropriately indemnify the Contractor. However, the inclusion of such a clause and the terms thereof are matters for negotiation and agreement between the Contractor and the subcontractor, provided that they do not conflict with the Government. It is also expected that any subcontractor subject to such indemnification will generally require substantially similar indemnification to be submitted by its subcontractors.

Note (4): If the subcontractor is a business unit which, pursuant to FAR 30.201-2(b) is entitled to elect modified contract coverage and to follow 30.401 and 30.402, the clause at 52.230-5, "Disclosure Consistency of Cost Accounting Practices," of the Federal Acquisition Regulation shall be inserted in lieu of this clause.

Note (5): The terms defined in FAR 30.301 and 31.001 shall have the same meanings herein. As there defined, "negotiated subcontract" means any subcontract except a firm-fixed-price subcontract made by a Contractor or subcontractor after receiving offers from at least two persons not associated with each other or with such Contractor or subcontractor, providing (1) the solicitation to all competitors is identical, (2) price is the only consideration in selecting the subcontractor from among the competitors solicited, and (3) the lowest offer received in compliance with the solicitation from among those solicited is accepted.

DELETE

57. FAR 52.230-4 ADMINISTRATION OF COST ACCOUNTING STANDARDS (SEP 1987) DELETE

For the purpose of administering the Cost Accounting Standards (CAS) requirements under this contract, the Contractor shall take the steps outlined in paragraphs (a) through (f) of this clause: DELETE

(a) Submit to the cognizant Contracting Officer a description of any accounting change, the potential impact of the change on contracts containing a CAS clause, and if not obviously immaterial, a general dollar magnitude cost impact analysis of the change which displays the potential shift of costs between CAS-covered contracts by contract type (i.e., firm-fixed-price, incentive, cost-plus-fixed-fee, etc.) and other contractor business activity. As related to CAS-covered contracts, the analysis should display the potential impact of funds of the various Agencies/Departments (i.e., Department of Energy, National Aeronautics and Space Administration, Army, Navy, Air Force, other Department of Defense, other Government) as follows:

(1) For any change in cost accounting practices required to comply with a new CAS in accordance with subparagraph (a)(3) and subdivision (a)(4)(i) of the CAS clause, within 60 days (or such other date as may be mutually agreed to) after award of a contract requiring this change.

(2) For any change in cost accounting practices proposed in accordance with subdivision (a)(4)(ii) or (a)(4)(iii) of the CAS clause or with subparagraph (a)(3) of the Disclosure and Consistency of Cost Accounting Practices clause, not less than 60 days (or such other date as may be mutually agreed to) before the effective date of the proposed change.

(3) For any failure to comply with an applicable CAS or to follow a disclosed practice as contemplated by subparagraph (a)(5) of the CAS clause or by subparagraph (a)(4) of the Disclosure and Consistency of Cost Accounting Practices clause, within 60 days (or such other date as may be mutually agreed to) after the date of agreement of noncompliance by the Contractor.

(b) Submit a cost impact proposal in the form and manner specified by the cognizant Contracting Officer within 60 days (or such other date as may be mutually agreed to) after the date of determination of the adequacy and compliance of a change submitted pursuant to paragraph (a) of this clause. If the cost impact proposal is not submitted within the specified time, or any extension granted by the cognizant Contracting Officer, an amount not to exceed 10 percent of each payment made after that date may be withheld until such time as a proposal has been provided in the form and manner specified by the cognizant Contracting Officer.

DELETE

(c) Agree to appropriate contract and subcontract amendments to reflect adjustments established in accordance with subparagraphs (a)(4) and (a)(5) of the CAS clause or with subparagraphs (a)(3) or (a)(4) of the CAS Disclosure and Consistency of Cost Accounting Practices clause.

(d) For all subcontracts subject either to the CAS clause or to the Disclosure and Consistency of Cost Accounting Practices clause--

(1) So state in the body of the subcontract, in the letter of award, or in both (self-deleting clauses shall not be used); and

(2) Include the substance of this clause in all negotiated subcontracts.

In addition, within 30 days after award of the subcontract, submit the following information to the Contractor's cognizant contract administration officer for transmittal to the contract administration office cognizant of the subcontractor's facility:

(i) Subcontractor's name and subcontract number.
(ii) Dollar amount and date of award.
(iii) Name of Contractor making the award.
(iv) Any changes the subcontractor has made or proposes to make to accounting practices that affect prime contract or subcontracts containing the CAS clause or Disclosure and Consistency of Cost Accounting Practices clause, unless these changes have already been reported. If award of the subcontract results in making one or more CAS effective for the first time, this fact shall also be reported.

(e) Notify the Contracting Officer in writing of any adjustments required to subcontracts under this contract and agree to an adjustment, based on them, to this contractor's price or estimated cost and fee. This notice is due within 30 days after proposed subcontract adjustments are received and shall include a proposal for adjusting the higher tier subcontract or the prime contract appropriately.

(f) For subcontracts containing the CAS clause, require the subcontractor to comply with all Standards in effect on the date of award or of final agreement on price, as shown on the subcontractor's signed Certificate of Current Cost or Pricing Data, whichever is earlier.

DELETE

58. FAR 52.232-9 LIMITATION ON WITHHOLDING OF PAYMENTS (APR 1984)

If more than one clause or Schedule term of this contract authorizes the temporary withholding of amounts otherwise payable to the Contractor for supplies delivered or services performed, the total of the amounts withheld at any one time shall not exceed the greatest amount that may be withheld under any one clause or Schedule term at that time; provided that this limitation shall not apply to-

(a) Withholdings pursuant to any clause relating to wages or hours of employees;

(b) Withholdings not specifically provided for by this contract;

(c) The recovery of overpayments; and

(d) Any other withholding for which the Contracting Officer determines that this limitation is inappropriate.

59. FAR 52.232-22 LIMITATION OF FUNDS (APR 1984)

(a) The parties estimate that performance of this contract will not cost the Government more than (1) the estimated cost specified in the Schedule or, (2) if this is a cost-sharing contract, the Government's state of the estimated cost specified in the Schedule. The Contractor agrees to use its best efforts to perform the work specified in the Schedule and all obligations under this contract within the estimated cost, which, if this is a cost-sharing contract, includes both the Government's and the Contractor's share of the cost.

(b) The Schedule specifies the amount presently available for payment by the Government and allotted tot his contract, the items covered, the Government's share of the cost if this is a cost-sharing contract, and the period of performance it is estimated the allotted amount will cover. The parties contemplate that the Government will allot additional funds incrementally to the contract up to the full estimated cost to the Government specified in the Schedule, exclusive of any fee. The Contractor agrees to perform, or have performed, work on the contract up to the point at which the total amount paid and payable by the Government under the contract approximates but does not exceed the total amount actually allotted by the Government to the contract.

(c) The Contractor shall notify the Contracting Officer in writing whenever it has reason to believe that the costs it expects to incur under this contract in the next 60 days, when added to all costs previously incurred, will exceed 75 percent of (1) the total amount so far allotted to the contract by the Government or, (2) if this is a cost-sharing contract, the amount then allotted to the contract by the Government plus the Contractor's corresponding share. The notice shall state the estimated amount of additional funds required to continue performance of the period specified in the Schedule.

(d) Sixty days before the end of the period specified in the Schedule, the Contractor shall notify the Contracting Officer in writing of the estimated amount of additional funds, if any, required to continue timely performance under the contract or for any further period specified in the Schedule or otherwise agreed upon, and when the funds will be required.

(e) If, after notification, additional funds are not allotted by the end of the period specified in the Schedule or another agree-upon date, upon the Contractor's written request the Contracting Officer will terminate this contract on that date in accordance with the provisions of the Termination clause of this contract. If the Contractor estimates that the funds available will allow it to continue to discharge its obligations beyond that date, it may specify a later date in its request, and the Contracting Officer may terminate this contract on that later date.

(f) Except as required by other provisions of this contract, specifically citing and stated to be an exception to this clause-

(1) The Government is not obligated to reimburse the Contractor for costs incurred in excess of the total amount allotted by; the Government to this contract; and

(2) The Contractor is not obligated to continue performance under this contract (including actions under the Termination clause of this contract) or otherwise incur costs in excess of (i) the amount then allotted to the contract by the Government or, (ii) if this is a cost-sharing contract, the amount then allotted by the Government to the contract plus the Contractor's corresponding share, until the Contracting Officer notifies the Contractor in writing that the amount allotted by the Government has been increased and specifies an increased amount, which shall then constitute the total amount allotted by the Government to this contract.

(g) The estimated cost shall be increased to the extent that (1) the amount allotted by the Government or, (2) if this is a cost-sharing contract, the amount then allotted by the Government to the contract plus the Contractor's corresponding share, exceeds the estimated cost specified in the Schedule. If this is a cost-sharing contract, the increase shall be allocated in accordance with the formula specified in the Schedule.

(h) No notice, communication, or representation in any form other than that specified in subparagraph (f)(2) above, or from any person other than the Contracting Officer, shall affect the amount allotted by; the Government to this contract. In the absence of the specified notice, the Government is not obligated to reimburse the Contractor for any costs in excess of the total amount allotted by the Government to this contract, whether incurred during the course of the contract or as a result of termination.

(i) When and to the extent that the amount allotted by the Government to the contract is increased, any costs the Contractor incurs before the increase that are in excess of (1) the amount previously allotted by the Government or, (2) if this is a cost-sharing contract, the amount previously allotted by the Government to the contract plus the Contractor's corresponding share, shall be allowable to the same extent as if incurred afterward, unless the Contracting Officer issues a termination or other notice and directs that the increase is solely to cover termination or other specified expenses.

(j) Change orders shall not be considered an authorization to exceed the amount allotted by the Government specified in the Schedule, unless they contain a statement increasing the amount allotted.

(k) Nothing in this clause shall affect the right of the Government to terminate this contract. If this contract is terminated, the Government and the Contractor shall negotiate an equitable distribution of all property produced or purchased under the contract, based upon the share of costs incurred by each.

(l) If the Government does not allot sufficient funds to allow completion of the work, the Contractor is entitled to a percentage of the fee specified in the Schedule equaling the percentage of the completion of the work contemplated by this contract.

60. FAR 52.232-23 ASSIGNMENT OF CLAIMS (JAN 1986)

(a) The Contractor, under the Assignment of Claims Act, as amended, 31 U.S.C. 3727, 41 U.S.C. 15 (hereafter referred to as "the Act"), may assign its rights to be paid amounts due or to become due as a result of the performance of this contract to a bank, trust company, or other financing institution, including any Federal lending agency. The assignee under such an assignment may thereafter further assign or reassign its right under the original assignment to any type of financing institution described in the preceding sentence.

(b) Any assignment or reassignment authorized under the Act and this clause shall cover all unpaid amounts payable under this contract, and shall not be made to more than one party, except that an assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in the financing of this contract.

(c) The Contractor shall not furnish or disclose to any assignee under this contract any classified document (including this contract) or information related to work under this contract until the Contracting Officer authorizes such action in writing.

61. FAR 52.232-25 PROMPT PAYMENT (AUG 1989)

Notwithstanding any other payment clause in this contract, the Government will make invoice payments and contract financing payments under the terms and conditions specified in this clause. Payment shall be considered as being made on the day a check is dated or an electronic funds transfer is made. Definitions of pertinent terms are set forth in 32.902. All days referred to in this clause are calendar days, unless otherwise specified. The term "foreign vendor" means an incorporated concern not incorporated in the United States, or an unincorporated concern having its principal place of business outside the United States.

(a) Invoice Payments.

(1) For purposes of this clause, "invoice payment" means a Government disbursement of monies to a Contractor under a contract or other authorization for supplies or services accepted by the Government. This includes payments for partial deliveries that have been accepted by the Government and final cost or fee payments where amounts owed have been settled between the Government and the Contractor.

(2) Except as indicated in subparagraph (a)(3) and paragraph (c) of this clause, the due date for making invoice payments by the designated payment office shall be the later of the following two events:

(i) The 30th day after the designated billing office has received a proper invoice from the Contractor.

(ii) The 30th day after Government acceptance of supplies delivered or services performed by the Contractor. On a final invoice where the payment amount is subject to contract settlement actions, acceptance shall be deemed to have occurred on the effective date of the contract settlement. However, if the designated billing office fails to annotate the invoice with the actual date of receipt the invoice payment due date shall be deemed to be the 30th day after the date the Contractor's invoice is dated, provided a proper invoice is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(3) The due date on contracts for meat and meat food products, contracts for perishable agricultural commodities, contracts for dairy products, edible fats or oils, and food products prepared from edible fats or oils, and contracts not requiring submission of an invoice shall be as follows:

(i) The due date for meat and meat food products, as defined in Section 2(a)(3) of the Packers and Stockyard Act of 1921 (7 U.S.C. 182(3)) and further defined in Pub. L. 98-181 to include any edible fresh or frozen poultry meat, any perishable poultry meat food product, fresh eggs, and any perishable egg product, will be as close as possible to, but not later than, the 7th day after product delivery.

(ii) The due date for perishable agricultural commodities, as defined in Section 1(4) of the Perishable Agricultural Commodities Act of 1930 (7 U.S.C. 499a(44)), will be as close as possible to, but not later than, the 10th day after product delivery, unless another date is specified in the contract.

(iii) The due date for dairy products, as defined in section 111(e) of the Dairy Production Stabilization Act of 1963 (7 U.S.C. 4502(e)), edible fats or oils, and food products prepared from edible fats or oils, will be as close as possible to, but not later than, the 10th day after the date on which a proper invoice has been received.

(iv) If the contract does not require submission of an invoice for payment (e.g. periodic lease payments), the due date will be as specified in the contract.

(4) An invoice is the Contractor's bill or written request for payment under the contract for supplies delivered or services performed. An invoice shall be prepared and submitted to the designated billing office specified in the contract. A proper invoice must include the items listed in subdivisions (a)(4)(i) through (a)(4)(viii) of this clause. If the invoice does not comply with these requirements, then the Contractor will be notified of the defect within 7 days after receipt of the invoice at the designated billing office (3 days for meat and meat food products and 5 days for perishable agricultural commodities, edible fats or oils, and food products prepared from edible fats or oils). Untimely notification will be taken into account in the computation of any interest penalty owed the Contractor in the manner described in subparagraph (a)(6) of this clause.

(i) Name and address of the Contractor.

(ii) Invoice date.

(iii) Contract number or other authorization for supplies delivered or services performed (including order number and contract line item number).

(iv) Description, quantity, unit of measure, unit price, and extended price of supplies delivered or services performed.

(v) Shipping and payment terms (e.g., shipment number and date of shipment, prompt payment discount terms). Bill of lading number and weight of shipment will be shown for shipments on Government bills of lading.

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number and mailing address of person to be notified in event of a defective invoice.

(viii) Any other information or documentation required by other requirements of the contract (such as evidence of shipment).

(5) An interest penalty shall be paid automatically by the Government, without request from the contractor, if payment is not made by the due date and the conditions listed in

subdivisions (a)(5)(i) through (a)(5)(iii) of this clause are met, if applicable. An interest penalty shall not be paid on contracts awarded to foreign vendors outside the United States for work performed outside the United States.

(i) A proper invoice was received by the designated billing office.

(ii) A receiving report or other Government documentation authorizing payment was processed and there was no disagreement over quantity, quality, or contractor compliance with any contract term or condition.

(iii) In the case of a final invoice for any balance of funds due the Contractor for supplies delivered or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(6) The interest penalty shall be at the rate established by the Secretary of the Treasury under Section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) that is in effect on the day after the due date, except where the interest penalty is prescribed by other governmental authority. This rate is referred to as the "Renegotiation Board Interest Rate," and it is published in the Federal Register semiannually on or about January 1 and July 1. The interest penalty shall accrue daily on the invoice payment amount approved by the Government and be compounded in 30-day increments inclusive from the first day after the due date through the payment date. That is, interest accrued at the end of any 30-day period will be added to the approved invoice payment amount and be subject to interest penalties if not paid in the succeeding 30-day period. If the designated billing office failed to notify the contractor of a defective invoice within the periods prescribed in subparagraph (a)(4) of this clause, then the due date on the corrected invoice will be adjusted by subtracting the number of days taken beyond the prescribed notification of defects period. Any interest penalty owed the Contractor will be based on this adjusted due date. Adjustments will be made by the designated payment office for errors in calculating interest penalties, if requested by the Contractor.

(i) For the sole purpose of computing an interest penalty that might be due the contractor, Government acceptance shall be deemed to have occurred constructively on the 7th day (unless otherwise specified in this contract) after the Contractor delivered the supplies or performed the services in accordance with the terms and conditions of the contract, unless there is a disagreement over quantity, quality, or contractor compliance with a contract provision. In the event that actual acceptance occurs within the constructive

acceptance period, the determination of an interest penalty shall be based on the actual date of acceptance. The constructive acceptance requirement does not, however, compel Government officials to accept supplies or services, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(ii) The following periods of time will not be included in the determination of an interest penalty:

(A) The period taken to notify the contractor of defects in invoices submitted to the Government, but this may not exceed 7 days (3 days for meat and meat food products and 5 days for perishable agricultural commodities, dairy products, edible fat or oils, and food products prepared from edible fats or oils).

(B) The period between the defects notice and resubmission of the corrected invoice by the Contractor.

(iii) Interest penalties will not continue to accrue after the filing of a claim for such penalties under the clause at 52.233-1, Disputes, or for more than 1 year. Interest penalties of less than $1.00 need not be paid.

(iv) Interest penalties are not required on payment delays due to disagreement between the Government and Contractor over the payment amount or other issues involving contract compliance or on amounts temporarily withheld or retained in accordance with the terms of the contract. Claims involving disputes, and any interest that may be payable, will be resolved in accordance with the clause at 52.233-1, Disputes.

(7) An interest penalty shall also be paid automatically by the designated payment office, without request from the contractor, if a discount for prompt payment is taken improperly. The interest penalty will be calculated as described in subparagraph (a)(6) of this clause on the amount of discount taken for the period beginning with the first day after the end of the discount period through the date when the contractor is paid.

(8) If this contract was awarded on or after October 1, 1989, a penalty amount, calculated in accordance with regulations issued by the Office of Management and Budget, shall be paid in addition to the interest penalty amount if the contractor--

(i) Is owed an interest penalty;

(ii) Is not paid the interest penalty within 10 days after the date the invoice amount is paid; and

(iii) Makes a written demand, not later than 40 days after the date the invoice amount is paid, that the agency pay such a penalty.

(b) Contract Financing Payments

(1) For purposes of this clause, "contract financing payment" means a Government disbursement of monies to a Contractor under a contract clause or other authorization prior to acceptance of supplies or services by the Government. Contract financing payments include advance payments, progress payments based on cost under the clause at 52.232-16, Progress Payments, progress payments based on a percentage or stage of completion (32.102(e)(1)) other than those made under the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, or the clause at 52.232-10, Payments Under Fixed-Price Architect-Engineer Contracts, and interim payments on cost type contracts.

(2) For contracts that provide for contract financing, requests for payment shall be submitted to the designated billing office as specified in this contract or as directed by the Contracting Officer. Contract financing payments shall be made on the (insert day as prescribed by Agency head; if not prescribed, insert 30th day) day after receipt of a proper contract financing request by the designated billing office. In the event that an audit or other review of a specific financing request is required to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the due date specified.

(3) For advance payments, loans, or other arrangements that do not involve recurrent submissions of contract financing requests, payment shall be made in accordance with the corresponding contract terms or as directed by the Contracting Officer.

(4) Contract financing payments shall not be assessed an interest penalty for payment delays.

(c) If this contract contains the clause at 5.213-1, Fast Payment Procedure, payments will be made within 15 days after the date of receipt of the invoice.

62. FAR 52.233-1 DISPUTES ALTERNATE I (APR 1984)

(a) This contract is subject to the Contract Disputes Act of 1978 (41 U.S.C. 601-613) (the Act).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or a written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding $50,000 is not a claim under the Act until certified as required by subparagraph (d)(2) below. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d) (1) A claim by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2) For Contractor claims exceeding $50,000, the Contractor shall submit with the claim a certification that--

(i) The claim is made in good faith;

(ii) Supporting data are accurate and complete to the best of the Contractor's knowledge and belief; and

(iii) The amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable.

(3) (i) If the Contractor is an individual, the certification shall be executed by that individual.

(ii) If the Contractor is not an individual, the certification shall be executed by--

(A) A senior company official in charge at the Contractor's plant or location involved; or

(B) An officer or general partner of the Contractor having overall responsibility for the conduct of the Contractor's affairs.

(e) For Contractor claims of $50,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over $50,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) The Government shall pay interest on the amount found due and unpaid from (1) the date the Contracting Officer receives the claim (properly certified if required), or (2) the date payment otherwise would be due, if that date is later, until the date of payment. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(h) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

63. FAR 52.233-3 PROTEST AFTER AWARD ALTERNATE 1 (JUN 1985)

(a) Upon receipt of a notice of protest (as defined in 33.101 of the FAR) the Contracting Officer may, by written order to the Contractor, direct the Contractor to stop performance of the work called for by this contract. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision in the protest, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Termination clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after a final decision in the protest, the Contractor shall resume work. The Contracting Office shall make an equitable adjustment in the delivery schedule, the estimated cost, the fee, or a combination thereof, and in any other terms of the contract may be affected and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor requests an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon the request at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

64. DEAR 952.235-70 KEY PERSONNEL (APR 1984)

The personnel specified below are considered to be essential to the work being performed hereunder. Prior to diverting any of the specified individuals to other programs, the Contractor shall notify the Contracting Officer reasonably in advance and shall submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on the program. No diversion shall be made by the Contractor without the written consent of the Contracting Officer: Provided, that the Contracting Officer may ratify in writing such diversion and such ratification shall constitute the consent of the Contracting Officer required by this clause.

The list below may be amended from time to time during the course of the contract to either add or delete personnel, as appropriate.

Title	Name
Contract Manager	Richard W. Tuttle
Fire Chief	Douglas R. MacDonald
Assistant Chief, Operations*	

*To be subsequently named.

65. FAR 52.237-2 PROTECTION OF GOVERNMENT BUILDINGS, EQUIPMENT, AND VEGETATION (APR 1984)

The Contractor shall use reasonable care to avoid damaging existing buildings, equipment, and vegetation on the Government installation. If the Contractor's failure to use reasonable care causes damage to any of this property, the Contractor shall replace or repair the damage at no expense to the Government as the Contracting Officer directs. If the Contractor fails or refuses to make such repair or replacement, the Contractor shall be liable for the cost, which may be deducted from the contract price.

66. FAR 52.237-3 CONTINUITY OF SERVICES (APR 1984)

(a) The Contractor recognizes that the services under this contract are vital to the Government and must be continued without interruption and that, upon contract expiration, a successor, either the Government or another Contractor, may continue them. The Contractor agrees to (1) furnish phase-in training and (2) exercise its best efforts and cooperation to effect an orderly and efficient transition to a successor.

(b) The Contractor shall, upon the Contracting Officer's written notice, (1) furnish phase-in, phase-out services for up to 60 days after this contract expires and (2) negotiate in good faith a plan with a successor to determine the nature and extent of phase-in, phase-out services required. The plan shall specify a training program and a date for transferring responsibilities for each division of work described in the plan, and shall be subject to the Contracting Officer's approval. The Contractor shall provide sufficient experienced personnel during the phase-in, phase-out period to ensure that the services called for by this contract are maintained at the required level of proficiency.

(c) The Contractor shall allow as many personnel as practicable to remain on the job to help the successor maintain the continuity and consistency of the services required by this contract. The Contractor also shall disclose necessary personnel records and allow the successor to conduct onsite interviews with these employees. If selected employees are agreeable to the change, the Contractor shall release them at a mutually agreeable date and negotiate transfer of their earned fringe benefits to the successor.

(d) The Contractor shall be reimbursed for all reasonable phase-in, phase-out costs (i.e., costs incurred within the agreed period after contract expiration that result from phase-in, phase-out operations) and a fee (profit) not to exceed a pro rata portion of the fee (profit) under this contract.

67. FAR 52.242-1 NOTICE OF INTENT TO DISALLOW COSTS (APR 1984)

(a) Notwithstanding any other clause of this contract--

(1) The Contracting Officer may at any time issue to the Contractor a written notice of intent to disallow specified costs incurred or planned for incurrence under this contract that have been determined not to be allowable under the contract terms; and

(2) The Contractor may, after receiving a notice under subparagraph (1) above, submit a written response to the Contracting Officer, with justification for allowance of the costs. If the Contractor does respond within 60 days, the Contracting Officer shall, within 60 days of receiving the response, either make a written withdrawal of the notice or issue a written decision.

(b) Failure to issue a notice under this Notice of Intent to Disallow Costs clause shall not affect the Government's rights to take exception to incurred costs.

68. FAR 52.243-2 CHANGES--COST-REIMBURSEMENT ALTERNATE I (AUG 1987)

(a) The Contracting Officer may at any time, by written order, and without notice to the sureties, if any, make changes within the general scope of this contract in any one or more of the following:

(1) Description of services to be performed.

(2) Time of performance (i.e., hours of the day, days of the week, etc.).

(3) Place of performance of the services.

(b) If any such change cause an increase or decrease in the estimated cost of, or the time required for, performance of any part of the work under this contract, whether or not changed by the order, or otherwise affects any other terms and conditions of this contract, the Contracting Officer shall make an equitable adjustment in the (1) estimated cost, delivery or completion schedule, or both; (2) amount of any fixed fee; and (3) other affected terms and shall modify the contract accordingly.

(c) The Contractor must assert its right to an adjustment under this clause within 30 days from the date of receipt of the written order. However, if the Contracting Officer decides that the facts justify it, the Contracting Officer may receive and act upon a proposal submitted before final payment of the contract.

(d) Failure to agree to any adjustment shall be a dispute under the Disputes clause. However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.

(e) Notwithstanding the terms and conditions of paragraphs (a) and (b) above, the estimated cost of this contract and, if this contract is incrementally funded, the funds allotted for the performance of this contract, shall not be increased or considered to be increased except by specific written modification of the contract indicating the new contract estimated cost and, of this contract is incrementally funded, the new amount allotted to the contract. Until this modification is made, the Contractor shall not be obligated to continue performance or incur costs beyond the point established in the Limitation of Cost or Limitation of Funds clause of this contract.

69. FAR 52.244-2 SUBCONTRACTS (COST-REIMBURSEMENT AND LETTER CONTRACTS) (JUL 1985)

(a) "Subcontract," as used in this clause, includes but is not limited to purchase orders, and changes and modifications to purchase orders. The Contractor shall notify the Contracting Officer reasonably in advance of entering into any subcontract if--

(1) The proposed subcontract is of the cost-reimbursement, time-and-materials, or labor-hour type;

(2) The proposed subcontract is fixed-price and exceeds either $25,000 or 5 percent of the total estimated cost of this contract;

(3) The proposed subcontract has experimental, developmental, or research work as one of its purposes; or

(4) This contract is not a facilities contract and the proposed subcontract provides for the fabrication, purchase, rental, installation, or other acquisition of special test equipment valued in excess of $10,000 or of any items of facilities.

(b) (1) In the case of a proposed subcontract that (i) is of the cost-reimbursement, time-and-materials, or labor-hour type and is estimated to exceed $10,000, including any fee, (ii) is proposed to exceed $100,000, or (iii) is one of a number of subcontracts with a single subcontractor, under this contract, for the same or related supplies or services that, in the aggregate, are expected to exceed $100,000, the advance notification required by paragraph (a) above shall include the information specified in subparagraph (2) below.

(2) (i) A description of the supplies or services to be subcontracted.

(ii) Identification of the type of subcontract to be used.

(iii) Identification of the proposed subcontractor and an explanation of why and how the proposed subcontract was selected, including the competition obtained.

(iv) The proposed subcontract price and the Contractor's cost or price analysis.

(v) The subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions.

(vi) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract.

(vii) A negotiation memorandum reflecting--

(A) The principal elements of the subcontract price negotiations;

(B) The most significant consideration controlling establishment of initial or revised prices;

(C) The reason cost or pricing data were or were not required;

(D) The extent, if any, to which the Contractor did not rely on the subcontractor's cost or pricing data in determining the price objective and in negotiating the final price;

(E) The extent to which it was recognized in the negotiation that the subcontractor's cost or pricing data were not accurate, complete, or current; the action taken by the Contractor and the subcontractor; and the effect of any such defective data on the total price negotiated;

(F) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and

(G) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.

(c) The Contractor shall obtain the Contracting Officer's written consent before placing any subcontract for which advance notification is required under paragraph (a) above. However, the Contracting Officer may ratify in writing any such subcontract. Ratification shall constitute the consent of the Contracting Officer.

(d) If the Contractor has an approved purchasing system and the subcontract is within the scope of such approval, the Contractor may enter into the subcontracts described in subparagraphs (a)(1) and (a)(2) above without the consent of the Contracting Officer, unless this contract is for the acquisition of major systems, subsystems, or their components.

(e) Even if the Contractor's purchasing system has been approved, the Contractor shall obtain the Contracting Officer's written consent before placing subcontracts that have been selected for special surveillance and identified in the Schedule of this contract.

(f) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall constitute a determination (1) of the acceptability of any subcontract terms or conditions, (2) of the allowability of any cost under this contract, or (3) to relieve the Contractor of any responsibility for performing this contract.

(g) No subcontract placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis, and any fee payable under cost-reimbursement type subcontracts shall not exceed the fee limitations in paragraph 15.903(d) of the Federal Acquisition Regulation (FAR).

(h) The Contractor shall give the Contracting Officer immediate written notice of any action or suit filed and prompt notice of any claim made against the Contractor by any subcontractor or vendor that, in the opinion of the Contractor, may result in litigation related in any way to this contract, with respect to which the Contractor may be entitled to reimbursement from the Government.

(i) (1) The Contractor shall insert in each price redetermination or incentive price revision subcontract under this contract the substance of the paragraph "Quarterly limitation on payments statement" of the clause at 52.216-5, Price Redetermination--Prospective, 52.216-6, Price Redetermination--Retroactive, 52.216-16, Incentive Price Revision--Firm Target, or 52.216-17, Incentive Price Revision--Successive Targets, as appropriate, modified in accordance with the paragraph entitled "Subcontracts" of that clause.

(2) Additionally, the Contractor shall include in each cost-reimbursement subcontract under this contract a requirement that the subcontractor insert the substance of the appropriate modified subparagraph referred to in subparagraph (1) above in each lower tier price redetermination or incentive price revision subcontract under that subcontract.

(j) To facilitate small business participation in subcontracting, the Contractor agrees to provide progress payments on subcontracts under this contract that are fixed-price subcontracts with small business concerns in conformity with the standards for customary progress payments stated in FAR 32.502-1 and 32.504(f), as in effect on the date of this contract. The Contractor further agrees that the need for such progress payments will not be considered a handicap or adverse factor in the award of subcontracts.

(k) The Government reserves the right to review the Contractor's purchasing system as set forth in FAR Subpart 44.3.

70. FAR 52.244-5 COMPETITION IN SUBCONTRACTING (APR 1984)

The Contractor shall select subcontractors (including suppliers) on a competitive basis to the maximum practical extent consistent with the objectives and requirements of the contract.

71. DEAR 952.245-5 GOVERNMENT PROPERTY (COST REIMBURSEMENT, TIME-AND-MATERIAL, OR LABOR-HOUR CONTRACTS) (JAN 1986)

(a) Government-furnished property.

(1) The term "Contractor's managerial personnel," as used in paragraph (g) of this clause, means any of the Contractor's directors, officers, managers, superintendents, or equivalent representatives who have supervision or direction of--

(i) All or substantially all of the Contractor's business;

(ii) All or substantially all of the Contractor's operation at any one plant, or separate location at which the contract is being performed; or

(iii) A separate and complete major industrial operation connected with performing this contract.

(2) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the Government-furnished property described in the Schedule or specifications, together with such related data and information as the Contractor may request and as may be reasonably required for the intended use of the property (hereinafter referred to as "Government-furnished property").

(3) The delivery or performance dates for this contract are based upon the expectation that Government-furnished property suitable for use will be delivered to the Contractor at the times stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet the contract's delivery or performance dates.

(4) If Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt, notify the Contracting

Officer, detailing the facts, and, as directed by the Contracting Officer and at Government expense, either effect repairs or modification or return or otherwise dispose of the property. After completing the directed action and upon written request of the Contractor, the Contracting Officer shall make an equitable adjustment as provided in paragraph (h) of this clause.

(5) If Government-furnished property is not delivered to the Contractor by the required time or times, the Contracting Officer shall, upon the Contractor's timely written request, make a determination of the delay, if any, caused the Contractor and shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(b) Changes in Government-furnished property.

(1) The Contracting Officer may, by written notice, (i) decrease the Government-furnished property provided or to be provided under this contract or (ii) substitute other Government-furnished property for the property to be provided by the Government or to be acquired by the Contractor for the Government under this contract. The Contractor shall promptly take such action as the Contracting Officer may direct regarding the removal, shipment, or disposal of the property covered by this notice.

(2) Upon the Contractor's written request, the Contracting Officer shall make an equitable adjustment to the contract in accordance with paragraph (h) of this clause, if the Government has agreed in the Schedule to make such property available for performing this contract and there is any--

(i) Decrease or substitution in this property pursuant to subparagraph (b)(1) above; or

(ii) Withdrawal of authority to use property, if provided under any other contract or lease.

(c) Title.

(1) The Government shall retain title to all Government-furnished property.

(2) Title to all property purchased by the Contractor for which the Contractor is entitled to be reimbursed as a direct item of cost under this contract shall pass to and vest in the Government upon the vendor's delivery of such property.

(3) Title to all other property, the cost of which is reimbursable to the Contractor, shall pass to and vest in the Government upon--

(i) Issuance of the property for use in contract performance;

(ii) Commencement of processing of the property or use in contract performance; or

(iii) Reimbursement of the cost of the property by the Government, whichever occurs first.

(4) All Government-furnished property and all property acquired by the Contractor, title to which vests in the Government under this paragraph (collectively referred to as "Government property"), are subject to the provisions of this clause. Title to Government property shall not be affected by its incorporation into or attachment to any property not owned by the Government, nor shall Government property become a fixture or lose its identity as personal property by being attached to any real property.

(d) Use of Government property.

The Government property shall be used only for performing this contract, unless otherwise provided in this contract or approved by the Contracting Officer.

(e) Property administration.

(1) The Contractor shall be responsible and accountable for all Government property provided under this contract and shall comply with Federal Acquisition Regulation (FAR) Subpart 45.5 and DOE Acquisition Regulation Subpart 945.5 as in effect on the date of this contract.

(2) The Contractor shall establish and maintain a program for the use, maintenance, repair, protection, and preservation of Government property in accordance with sound business practice and the applicable provisions of FAR Subpart 45.5 and DOE Acquisition Regulation Subpart 945.5.

(3) If damage occurs to Government property, the risk of which has been assumed by the Government under this contract, the Government shall replace the items or the Contractor shall make such repairs as the Government directs. However, if the Contractor cannot effect such repairs within the time required, the Contractor shall dispose of the property as directed by the Contracting Officer. When any property for which the Government is responsible is replaced or repaired,

the Contracting Officer shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(f) Access.

The Government and all its designees shall have access at all reasonable times to the premises in which any Government property is located for the purpose of inspecting the Government property.

(g) Limited risk of loss.

(1) The Contractor shall not be liable for loss or destruction of, or damage to, the Government property provided under this contract or for expenses incidental to such loss, destruction, or damage, except as provided in subparagraphs (2) and (3) below.

(2) The Contractor shall be responsible for loss or destruction of, or damage to, the Government property provided under this contract (including expenses incidental to such loss, destruction, or damage)--

(i) That results from a risk expressly required to be insured under this contract, but only to the extent of the insurance required to be purchased and maintained or to the extent of insurance actually purchased and maintained, whichever is greater;

(ii) That results from a risk that is in fact covered by insurance or for which the Contractor is otherwise reimbursed, but only to the extent of such insurance or reimbursement;

(iii) For which the Contractor is otherwise responsible under the express terms of this contract;

(iv) That results from willful misconduct or lack of good faith on the part of the Contractor's managerial personnel; or

(v) That results from a failure on the part of the Contractor, due to willful misconduct or lack of good faith on the part of the Contractor's managerial personnel, to establish and administer a program or system for the control, use, protection, preservation, maintenance, and repair of Government property as required by paragraph (e) of this clause.

(3) (i) If the Contractor fails to act as provided by subdivision (g)(2)(v) above, after being notified (by certified mail addressed to one of the Contractor's managerial personnel)

of the Government's disapproval, withdrawal of approval, or nonacceptance of the system or program, it shall be conclusively presumed that such failure was due to willful misconduct or lack of good faith on the part of the Contractor's managerial personnel.

(ii) In such event, any loss or destruction of, or damage to, the Government property shall be presumed to have resulted from such failure unless the Contractor can establish by clear and convincing evidence that such loss, destruction, or damage--

(A) Did not result from the Contractor's failure to maintain an approved program or system; or

(B) Occurred while an approved program or system was maintained by the Contractor.

(4) If the Contractor transfers Government property to the possession and control of a subcontractor, the transfer shall not affect the liability of the Contractor for loss or destruction of, or damage to, the property as set forth above. However, the Contractor shall require the subcontractor to assume the risk of, and be responsible for, any loss or destruction of, or damage to, the property while in the subcontractor's possession or control, except to the extent that the subcontract, with the advance approval of the Contracting Officer, relieves the subcontractor from such liability. In the absence of such approval, the subcontract shall contain appropriate provisions requiring the return of all Government property in as good condition as when received, except for reasonable wear and tear or for its use in accordance with the provisions of the prime contract.

(5) Upon loss or destruction of, or damage to, Government property provided under this contract, the Contractor shall so notify the Contracting Officer and shall communicate with the loss and salvage organization, if any, designated by the Contracting Officer. With the assistance of any such organization, the Contractor shall take all reasonable action to protect the Government property from further damage, separate the damaged and undamaged Government property, put all the affected Government property in the best possible order, and furnish to the Contracting Officer a statement of--

(i) The lost, destroyed, or damaged Government property;

(ii) The time and origin of the loss, destruction, or damage;

(iii) All known interests in commingled property of which the Government property is a part; and

(iv) The insurance, if any, covering any part of or interest in such commingled property.

(6) The Contractor shall repair, renovate, and take such other action with respect to damaged Government property as the Contracting Officer directs. If the Government property is destroyed or damaged beyond practical repair, or is damaged and so commingled or combined with property of others (including the Contractor's) that separation is impractical, the Contractor may, with the approval of and subject to any conditions imposed by the Contracting Officer, sell such property for the account of the Government. Such sales may be made in order to minimize the loss to the Government, to permit the resumption of business, or to accomplish a similar purpose. The Contractor shall be entitled to an equitable adjustment in the contract price for the expenditures made in performing the obligations under this subparagraph (g)(6) in accordance with paragraph (h) of this clause. However, the Government may directly reimburse the loss and salvage organization for any of their charges. The Contracting Officer shall give due regard to the Contractor's liability under this paragraph (g) when making any such equitable adjustment.

(7) The Contractor shall not be reimbursed for, and shall not include as an item of over head, the cost of insurance or of any reserve covering risk of loss or destruction of, or damage to, Government property, except to the extent that the Government may have expressly required the Contractor to carry such insurance under another provision of this contract.

(8) In the event the Contractor is reimbursed or otherwise compensated for any loss or destruction of, or damage to, Government property, the Contractor shall use the proceeds to repair, renovate, or replace the lost, destroyed, or damaged Government property or shall otherwise credit the proceeds to, or equitably reimburse, the Government, as directed by the Contracting Officer.

(9) The Contractor shall do nothing to prejudice the Government's rights to recover against third parties for any loss or destruction of, or damage to, Government property. Upon the request of the Contracting Officer, the Contractor shall, at the Government's expense, furnish to the Government all reasonable assistance and cooperation (including the prosecution of suit and the execution of instruments of assignment in favor of the Government) in obtaining recovery. In addition, where a subcontractor has not been relieved from

liability for any loss or destruction of, or damage to, Government property, the Contractor shall enforce for the benefit of the Government the liability of the subcontractor for such loss, destruction, or damage.

(h) Equitable adjustment.

When this clause specifies an equitable adjustment, it shall be made to any affected contract provision in accordance with the procedures of the Changes clause. When appropriate, the Contracting Officer may initiate an equitable adjustment in favor of the Government. The right to an equitable adjustment shall be the Contractor's exclusive remedy. The Government shall not be liable to suit for breach of contract for--

(1) Any delay in delivery of Government-furnished property;

(2) Delivery of Government-furnished property in a condition not suitable for its intended use;

(3) A decrease in or substitution of Government-furnished property; or

(4) Failure to repair or replace Government property for which the Government is responsible.

(i) Final accountingagraph (h) of this clause may properly include restoration or rehabilitation costs.

(k) Communications.

All communications under this clause shall be in writing.

(l) Overseas contracts.

If this contract is to be performed outside the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished," respectively.

72. FAR 52.246-5 INSPECTION OF SERVICES - COST-REIMBURSEMENT (APR 1984)

(a) Definition. "Services" as used in this clause, includes services performed, workmanship, and material furnished or used in performing services.

(b) The Contractor shall provide and maintain an inspection system acceptable to the Government covering the services under this contract. Complete records of all inspection work performed by the Contractor shall be maintained and made available to the Government during contract performance and for as long afterwards as the contract requires.

(c) The Government has the right to inspect and test all services called for by the contract, to the extent practicable at all places and times during the term of the contract. The Government shall perform inspections and tests in a manner that will not unduly delay the work.

(d) If any of the services performed do not conform with contract requirements, the Government may require the Contractor to perform the services again in conformity with contract requirements, for no additional fee. When the defects in services cannot be corrected by reperformance, the Government may (1) require the Contractor to take necessary action to ensure that future performance conforms to contract requirements and (2) reduce any fee payable under the contract to reflect the reduced value of the services performed.

(e) If the Contractor fails to promptly perform the services again or take the action necessary to ensure future performance in conformity with contract requirements, the Government may (1) by contract or otherwise, perform the services and reduce any fee payable by an amount that is equitable under the circumstances or (2) terminate the contract for default.

73. FAR 52.246-25 LIMITATION OF LIABILITY-SERVICES (APR 1984)

(a) Except as provided in paragraphs (b) and (c) below, and except to the extent that the Contractor is expressly responsible under this contract for deficiencies in the services required to be performed under it (including any materials furnished in conjunction with those services), the Contractor shall not be liable for loss of or damage to property of the Government that (1) occurs after Government acceptance of services performed under this contract and (2) results from any defects or deficiencies in the services performed or materials furnished.

(b) The limitation of liability under paragraph (a) above shall not apply when a defect or deficiency in, or the Government's acceptance of, services performed or materials furnished results from willful misconduct or lack of good faith on the part of any of the Contractor's managerial personnel. The term "Contractor's managerial personnel," as used in this

clause, means the Contractor's directors, officers, and any of the Contractor's managers, superintendents, or equivalent representatives who have supervision or direction of--

(1) All or substantially all of the Contractor's business;

(2) All or substantially all of the Contractor's operations at any one plant, laboratory, or separate location at which the contract is being performed; or

(3) A separate and complete major industrial operation connected with the performance of this contract.

(c) If the Contractor carries insurance, or has established a reserve for self-insurance, covering liability for loss or damage suffered by the Government through the Contractor's performance of services or furnishing of materials under this contract, the Contractor shall be liable to the Government, to the extent of such insurance or reserve, for loss of or damage to property of the Government occurring after Government acceptance of, and resulting from any defects and deficiencies in, services performed or materials furnished under this contract.

(d) The Contractor shall include this clause, including this paragraph (d), supplemented as necessary to reflect the relationship of the contracting parties, in all subcontracts over $25,000.

74. FAR 52.247-34 F.O.B. DESTINATION (NOV 1991)

(a) The term "f.o.b. destination," as used in this clause means:

(1) Free of expense to the Government, on board the carrier's conveyance, at a specified delivery point where the consignee's facility (plant, warehouse, store, lot, or other location to which shipment can be made) is located; and

(2) Supplies shall be delivered to the destination consignee's wharf (if destination is a port city and supplies are for export), warehouse unloading platform, or receiving dock, at the expense of the Contractor. The Government shall not be liable for any delivery, storage, demurrage, accessorial, or other charges involved before the actual delivery (or "constructive placement" as defined in carrier tariffs) or the supplies to the destination, unless such charges are caused by an act or order of the Government acting in its contractual capacity. If rail carrier is used, supplies shall be delivered to the specified unloading platform of the

consignee. If motor carrier (including "piggyback") is used, supplies shall be delivered to truck tailgate at the unloading platform of the consignee, except when the supplies delivered meet the requirements of Item 568 of the Material Motor Freight Classification for "heavy or bulky freight". When supplies meeting the requirements of the referenced Item 568 are delivered, unloading (including movement to the tailgate) shall be performed by the consignee, with assistance from the truck driver, if requested. If the Contractor uses rail carrier or freight forwarder for less than carload shipments, the Contractor shall assure that the carrier will furnish tailgate delivery, when required, if transfer to truck is required to complete delivery to consignee.

(b) The Contractor shall--

(1) (i) Pack and mark the shipment to comply with contract specifications; or

(ii) In the absence of specifications, prepare the shipment in conformance with carrier requirements;

(2) Prepare and distribute commercial bills of lading;

(3) Deliver the shipment in good order and condition to the point of delivery specified in the contract;

(4) Be responsible for any loss of and/or damage to the goods occurring before receipt of the shipment by the consignee at the delivery point specified in the contract;

(5) Furnish a delivery schedule and designate the mode of delivering carrier; and

(6) Pay and bear all charges to the specified point of delivery.

75. FAR 52.249-6 TERMINATION (COST-REIMBURSEMENT) (MAY 1986)

(a) The Government may terminate performance of work under this contract in whole or, from time to time, in part, if--

(1) The Contracting Officer determines that a termination is in the Government's interest; or

(2) The Contractor defaults in performing this contract and fails to cure the default within 10 days (unless extended by the Contracting Officer) after receiving a notice specifying the default. "Default" includes failure to make progress in the work so as to endanger performance.

(b) The Contracting Officer shall terminate by delivering to the Contractor a Notice of Termination specifying whether termination is for default of the Contractor or for convenience of the Government, the extent of termination, and the effective date. If, after termination for default, it is determined that the Contractor was not in default or that the Contractor's failure to perform or to make progress in performance is due to causes beyond the control and without the fault or negligence of the Contractor as set forth in the Excusable Delays clause, the rights and obligations of the parties will be the same as if the termination was for the convenience of the Government.

(c) After receipt of a Notice of Termination, and except as directed by the Contracting Officer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:

(1) Stop work as specified in the notice.

(2) Place no further subcontracts or orders (referred to as subcontracts in this clause), except as necessary to complete the continued portion of the contract.

(3) Terminate all subcontracts to the extent they relate to the work terminated.

(4) Assign to the Government, as directed by the Contracting Officer, all right, title, and interest of the Contractor under the subcontracts terminated, in which case the Government shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.

(5) With approval or ratification to the extent required by the Contracting Officer, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts, the cost of which would be reimbursable in whole or in part, under this contract; approval or ratification will be final for purposes of this clause.

(6) Transfer title (if not already transferred) and, as directed by the Contracting Officer, deliver to the Government (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, (ii) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be

required to be furnished to the Government, and (iii) the jigs, dies, fixtures, and other special tools and tooling acquired or manufactured for this contract, the cost of which the Contractor has been or will be reimbursed under this contract.

(7) Complete performance of the work not terminated.

(8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.

(9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (6) above; provided, however, that the Contractor (i) is not required to extend credit to any purchaser and (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.

(d) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept the items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.

(e) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Code.

(8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.

(9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (6) above; provided, however, that the Contractor (i) is not required to extend credit to any purchaser and (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.

(d) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept the items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.

(e) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 1-year period. However, if the Contracting Officer determines that the facts justify it, a termination settlement proposal may be received and acted on after 1 year or any extension. If the Contractor fails to submit the proposal within the time allowed, the Contracting Officer may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.

(f) Subject to paragraph (e) above, the Contractor and the Contracting Officer may agree on the whole or any part of the amount to be paid (including an allowance for fee) because of the termination. The contract shall be amended, and the Contractor paid the agreed amount.

(g) If the Contractor and the Contracting Officer fail to agree in whole or in part on the amount of costs and/or fee to be paid because of the termination of work, the Contracting

Officer shall determine, on the basis of information available, the amount, if any, due the Contractor, and shall pay that amount, which shall include the following:

(1) All costs reimbursable under this contract, not previously paid, for the performance of this contract before the effective date of the termination, and part of those costs that may continue for a reasonable time with the approval of or as directed by the Contracting Officer; however, the Contractor shall discontinue those costs as rapidly as practicable.

(2) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subparagraph (1)above.

(3) The reasonable costs of settlement of the work terminated, including--

(i) Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data;

(ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory. If the termination is for default, no amounts for the preparation of the Contractor's termination settlement proposal maybe included.

(4) A portion of the fee payable under the contract, determined as follows:

(i) If the contract is terminated for the convenience of the Government, the settlement shall include a percentage of the fee equal to the percentage of completion of work contemplated under the contract, but excluding subcontract effort included in subcontractors' termination proposals, less previous payments for fee.

(ii) If the contract is terminated for default, the total fee payable shall be such proportionate part of the fee as the total number of articles (or amount of services) delivered to and accepted by the Government is to the total number of articles (or amount of services) of a like kind required by the contract.

(5) If the settlement includes only fee, it will be determined under subparagraph (g)(4) above.

(h) The cost principles and procedures in Part 31 of the Federal Acquisition Regulation, in effect on the date of this contract, shall govern all costs claimed, agreed to, or determined under this clause.

(i) The Contractor shall have the right of appeal, under the Disputes clause, from any determination made by the Contracting Officer under paragraph (e) or (g) above or paragraph (k) below, except that if the Contractor failed to submit the termination settlement proposal within the time provided in paragraph (e) and failed to request a time extension, there is no right of appeal. If the Contracting Officer has made a determination of the amount due under paragraph (e), (g) or (k), the Government shall pay the Contractor (1) the amount determined by the Contracting Officer if there is no right of appeal or if no timely appeal has been taken, or (2) the amount finally determined on an appeal.

(j) In arriving at the amount due the Contractor under this clause, there shall be deducted--

(1) All unliquidated advance or other payments to the Contractor, under the terminated portion of this contract;

(2) Any claim which the Government has against the Contractor under this contract; and

(3) The agreed price for, or the proceeds of sale of materials, supplies, or other things acquired by the Contractor or sold under this clause and not recovered by or credited to the Government.

(k) The Contractor and Contracting Officer must agree to any equitable adjustment in fee for the continued portion of the contract when there is a partial termination. The Contracting Officer shall amend the contract to reflect the agreement.

(l) (1) The Government may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the contract, if the Contracting Officer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.

(2) If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the Government upon demand, together with interest computed at

the rate established by the Secretary of the Treasury under 50 U.S.C. App. 1215(b)(2). Interest shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's termination settlement proposal because of retention or other disposition of termination inventory until 10 days after the date of the retention or disposition, or a later date determined by the Contracting Officer because of the circumstances.

(m) The provisions of this clause relating to fee are inapplicable if this contract does not include a fee.

76. FAR 52.249-14 EXCUSABLE DELAYS (APR 1984)

(a) Except for defaults of subcontractors at any tier, the Contractor shall not be in default because of any failure to perform this contract under its terms if the failure arises from causes beyond the control and without the fault or negligence of the Contractor. Examples of these causes are (1) acts of God or of the public enemy, (2) acts of the Government in either its sovereign or contractual capacity, (3) fires, (4) floods, (5) epidemics, (6) quarantine restrictions, (7) strikes, (8) freight embargoes, and (9) unusually severe weather. In each instance, the failure to perform must be beyond the control and without the fault or negligence of the Contractor. "Default" includes failure to make progress in the work so as to endanger performance.

(b) If the failure to perform is caused by the failure of a subcontractor at any tier to perform or make progress, and if the cause of the failure was beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either, the Contractor shall not be deemed to be in default, unless--

(1) The subcontracted supplies or services were obtainable from other sources;

(2) The Contracting Officer ordered the Contractor in writing to purchase these supplies or services from the other source; and

(3) The Contractor failed to comply reasonably with this order.

(c) Upon request of the Contractor, the Contracting Officer shall ascertain the facts and extent of the failure. If the Contracting Officer determines that any failure to perform results from one or more of the causes above, the

delivery schedule shall be revised, subject to the rights of the Government under the termination clause of this contract.

77. DEAR 952.250-70 NUCLEAR HAZARDS INDEMNITY AGREEMENT (NOV 1991)

(a) Authority. This clause is incorporated into this contract pursuant to the authority contained in subsection 170d. of the Atomic Energy Act of 1954, as amended (hereinafter called the Act).

(b) Definitions. The definitions set out in the Act shall apply to this clause.

(c) Financial protection. Except as hereafter permitted or required in writing by DOE, the contractor will not be required to provide or maintain, and will not provide or maintain at Government expense, any form of financial protection to cover public liability, as described in paragraph (d)(2) below. DOE may, however, at any time require in writing that the contractor provide and maintain financial protection of such a type and in such amount as DOE shall determine to be appropriate to cover such public liability, provided that the costs of such financial protection are reimbursed to the contractor by DOE.

(d) Indemnification.

(1) To the extent that the contractor and other persons indemnified are not compensated by any financial protection permitted or required by DOE, DOE will indemnify the contractor and other persons indemnified against (i) claims for public liability as described in subparagraph (d)(2) of this clause; and (ii) such legal costs of the contractor and other persons indemnified as are approved by DOE, provided that DOE's liability, including such legal costs, shall not exceed the amount set forth in section 170e.(1)(B) of the Act in the aggregate for each nuclear incident or precautionary evacuation occurring within the United Staes or $100 million in the aggregate for each nuclear incident occurring outside the United States, irrespective of the number of persons indemnified in connection with this contract.

(2) The public liability referred to in subparagraph (d)(1) of this clause is public liability as defined in the Act which (i) arises out of or in connection with the activities under this contract, including transportation; and (ii) arises out of or results from a nuclear incident or precautionary evacuation, as those terms are defined in the Act.

(e) Waiver of Defenses.

(1) In the event of a nuclear incident, as defined in the Act, arising out of nuclear waste activities, as defined in the Act, the contractor, on behalf of itself and other persons indemnified, agrees to waive any issue or defense as to charitable or governmental immunity.

(2) In the event of an extraordinary nuclear occurrence which:

(i) Arises out of, results from, or occurs in the course of the construction, possession, or operation of a production or utilization facility; or

(ii) Arises out of, results from, or occurs in the course of transportation of source material, by-product material, or special nuclear material to or from a production or utilization facility; or

(iii) Arises out of or results from the possession, operation, or use by the contractor or a subcontractor of a device utilizing special nuclear material or by-product material, during the course of the contract activity; or

(iv) Arises out of, results from, or occurs in the course of nuclear waste activities, the contractor, on behalf of itself and other persons indemnified, agrees to waive:

(A) Any issue or defense as to the conduct of the claimant (including the conduct of persons through whom the claimant derives its cause of action) or fault or persons indemnified, including, but not limited to:

1. Negligence;
2. Contributory negligence;
3. Assumption of risk; or
4. Unforeseeable intervening causes; whether involving the conduct of a third person or an act of God;

(B) Any issue or defense as to charitable or governmental immunity; and

(C) Any issue or defense based on any statute of limitations, if suit is instituted within 3 years from the date on which the claimant first knew, or reasonably could have known, of his injury or damage and the cause thereof. The waiver of any such issue or defense shall be effective regardless of whether such issue or defense may otherwise be

deemed jurisdictional or relating to an element in the cause of action. The waiver shall be judicially enforceable in accordance with its terms by the claimant against the person indemnified.

(v) The term extraordinary nuclear occurrence means an event which DOE has determined to be an extraordinary nuclear occurrence as defined in the Act. A determination of whether or not there has been an extraordinary nuclear occurrence will be made in accordance with the procedures in 10 CFR part 840.

(vi) For the purposes of that determination, "offsite" as that term is used in 10 CFR part 840 means away from "the contract location" which phrase means any DOE facility, installation, or site at which contractual activity under this contract is being carried on, and any contractor-owned or controlled facility, installation, or site at which the contractor is engaged in the performance of contractual activity under this contract.

(3) The waivers set forth above:

(i) Shall be effective regardless of whether such issue or defense may otherwise be deemed jurisdictional or relating to an element in the cause of action;

(ii) Shall be judicially enforceable in accordance with its terms by the claimant against the person indemnified;

(iii) Shall not preclude a defense based upon a failure to take reasonable steps to mitigate damages;

(iv) Shall not apply injury or damage to a claimant or to a claimant's property which is intentionally sustained by the claimant or which results from a nuclear incident intentionally and wrongfully caused by the claimant;

(v) Shall not apply to injury to a claimant who is employed at the site of and in connection with the activity where the extraordinary nuclear occurrence takes place, if benefits therefor are either payable or required to be provided under any workmen's compensation or occupational disease law;

(vi) Shall not apply to any claim resulting from a nuclear incident occurring outside the United States;

(vii) Shall be effective only with respect to those obligations set forth in this clause and in insurance policies, contracts or other proof of financial protection; and

(viii) Shall not apply to, or prejudice the prosecution or defense of, any claim or portion of claim which is not within the protection afforded under (A) the limit of liability provisions under subsection 170e. of the Act, and (B) the terms of this agreement and the terms of insurance policies, contracts, or other proof of financial protection.

(f) Notification and litigation of claims. The contractor shall give immediate written notice to DOE of any known action or claim filed or made against the contractor or other person indemnified for public liability as defined in paragraph (d)(2). Except as otherwise directed by DOE, the contractor shall furnish promptly to DOE, copies of all pertinent papers received by the contractor or filed with respect to such actions of claims. DOE shall have the right to, and may collaborate with, the contractor and any other person indemnified in the settlement or defense of any action or claim and shall have the right to (1) require the prior approval of DOE for the payment of any claim that DOE may be required to indemnify hereunder; and (2) appear through the Attorney General on behalf of the contractor or other person indemnified in any action brought upon any claim that DOE may be required to indemnify hereunder, take charge of such action, and settle or defend any such action. If the settlement of defense of any such action or claim is undertaken by DOE, the contractor or other person indemnified shall furnish all reasonable assistance in effecting a settlement or asserting a defense.

(g) Continuity of DOE obligations. The obligations of DOE under this clause shall not be affected by any failure on the part of the contractor to fulfill its obligation under this contract and shall be unaffected by the death, disability, or termination of existence of the contractor, or by the completion, termination or expiration of this contract.

(h) Effect of other clauses. The provisions of this clause shall not be limited in any way by, and shall be interpreted without reference to, any other clause of this contract, including the clause entitled Contract Disputes, provided, however, that this clause shall be subject to the clauses entitled Covenant Against Contingent Fees, Officials Not to Benefit, and Examination of Records by the Comptroller General, and any provisions that are later added to this contract as required by applicable Federal law, including statutes, executive orders and regulations, to be included in Nuclear Hazards Indemnity Agreements.

(i) Civil penalties. The contractor and its subcontractors and suppliers who are indemnified under the provisions of this clause are subject to civil penalties, pursuant to 234A of the Act, for violations of applicable DOE nuclear-safety related rules, regulations, or orders.

(j) Criminal penalties. Any individual director, officer, or employee of the contractor or of its subcontractors and suppliers who are indemnified under the provisions of this clause are subject to criminal penalties, pursuant to 223c. of the Act, for knowing and willful violation of the Atomic Energy Act of 1954, as amended, and applicable DOE nuclear safety-related rules, regulations or orders which violation results in, or, if undetected, would have resulted in a nuclear incident.

(k) Inclusion in subcontracts. The contractor shall insert this clause in any subcontract which may involve the risk of public liability, as that term is defined in the Act and further described in paragraph (d)(2) above. However, this clause shall not be included in subcontracts in which the subcontractor is subject to Nuclear Regulatory Commission (NRC) financial protection requirements under section 170b. of the Act or NRC agreements of indemnification under section 170c. or k. of the Act for the activities under the subcontract.

78. FAR 52.251-1 GOVERNMENT SUPPLY SOURCES (APR 1984)

The Contracting Officer may issue the Contractor an authorization to use Government supply sources in the performance of this contract. Title to all property acquired by the Contractor under such an authorization shall vest in the Government unless otherwise specified in the contract. Such property shall not be considered to be "Government-furnished property," as distinguished from "Government property." The provisions of the clause entitled "Government Property," except its paragraphs (a) and (b), shall apply to all property acquired under such authorization.

79. FAR 52.251-2 INTERAGENCY FLEET MANAGEMENT SYSTEM VEHICLES AND RELATED SERVICES (JAN 1991)

The Contracting Officer may issue the Contractor an authorization to obtain interagency fleet management system vehicles and related services for use in the performance of this contract. The use, service, and maintenance of interagency fleet management system vehicles and the use of related services by the Contractor shall be in accordance with 41 CFR 101-39 and 41 CFR 101-38.301-1.

80. DEAR 952.251-70 CONTRACTOR EMPLOYEE TRAVEL DISCOUNTS (APR 1989)

(a) Contracted airlines. Airlines participating in travel discounts are listed in the Federal Travel Directory (FTD), published monthly by the General Services Administration (GSA). Regulations governing the use of contracted airlines are contained in the Federal Property Management Regulation (FPMR), Temporary Regulation A-30. Temporary Regulation A-30 stipulates that cost- reimbursable contractor employees may obtain discount air fares by use of a Government Transportation Request (GTR), Standard Form 1169, cash or personal credit cards. When the GTR is used, contracting officers may issue a blanket GTR for a period of not less than two weeks nor more than one month. In unusual circumstances, such as prolonged or international travel, the contracting officer may extend the period for which a blanket GTR is effective to a maximum of three months. Contractors will ensure that their employees traveling under GTR's provide the GTR number to the contracted airlines for entry on individual tickets and on month-end billings to the contractor.

(b) Hotels/motels. Participating hotels and motels which extend discounts are listed in the FTD, which shows rates, facilities, and identifies by code those which offer reduced rates to cost-reimbursable contractor employees while traveling on official contract business.

(c) Car rentals. The Military Traffic Management Command (MTMC) Department of Defense, negotiates rate agreements with car rental companies for special flat rates and unlimited mileage. Participating car rental companies which offer these terms on to cost-reimbursable contractor employees while traveling on official contract business are listed in the FTD.

(d) Procedures for obtaining service.

(1) Identification and method of payment requirements for participating Federal contracted airlines are listed in the FTR. Travel discount air fares may be ordered by the issuance of a GTR either directly to the contractor, or to a Scheduled Airline Travel Office (SATO) or Federal Travel Management Center (FTMC), provided the letter of identification signed by the cognizant contracting officer accompanies the order. In appropriate instances, such as geographical proximity, contractors may obtain discount air fares through a DOE office or a cooperating local travel agency when neither a SATO or FTMC is available. Some airlines allow the purchase of discounted air fares with cash or credit card.

(2) In the case of hotel and motel accommodations, reservations may be made by the contractor employee directly with the hotel or motel but the employee must display, on arrival, the letter of identification and any other identification required by the hotel or motel proprietorship.

(3) For car rentals, generally the same procedures as in (d)(2) above will be followed in arranging reservations and obtaining discounts.

(e) Standard letter of identification. Contractors shall prepare for the authorizing contracting officer a letter of identification based on the following format:

Format for Government Contractors to Qualify for Travel Discounts (To be typed on agency official letterhead)

To: (Source of ticketing, accommodations or rental)

Subject: Official Travel of Government Contractor

(Full name of traveler), bearer of this letter, is an employee of (company name) which is under contract to this agency under the Government contract (contract number). During the period of the contract (give dates), the employee is eligible and authorized to use available discount rates for contract-related travel in accordance with your contract and/or agreement with the Federal Government.

(Signature, title and telephone number of the contracting officer)

81. FAR 52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

(b) The use in this solicitation or contract of any Department of Energy Acquisition Regulation (48 CFR Chapter 9) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

82. DEAR 970.5204-2 SAFETY AND HEALTH (GOVERNMENT-OWNED OR LEASED) (APR 1984)

The Contractor shall take all reasonable precautions in the performance of the work under this contract to protect the safety and health of employees and of members of the public and shall comply with all applicable safety and health regulations

and requirements (including reporting requirements) of DOE. The Contracting Officer shall notify the Contractor, in writing, of any noncompliance with the provisions of the clause and the corrective action to be taken. After receipt of such notice, the Contractor shall immediately take corrective action. The Contractor shall submit a management program and implementation plan to the Contracting Officer for review and approval within 30 days after the date of award of this contract. In the event that the Contractor fails to comply with said regulations or requirements of DOE, the Contracting Officer may, without prejudice to any other legal or contractual rights of DOE, issue an order stopping all or any part of the work; thereafter, a start order for resumption of the work may be issued at the discretion of the Contracting Officer. The Contractor shall make no claim for an extension of time or for compensation or damages by reason of, or in connection with, such work stoppage.

83. CLAUSE DOE PR 9-9.110(C) - REPORTING OF ROYALTIES

If this contract is in an amount which exceeds $25,000 and if any royalty payments are directly involved in the contract or are reflected in the contract price to the Government, the Contractor agrees to report in writing to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) during the performance of this contract and prior to its completion or final settlement, the amount of any royalties or other payments paid or to be paid by it directly to others in connection with the performance of this contract together with the names and addresses of licensors to who such payments are made and either the patent numbers involved or such other information as will permit the identification of the patents or other basis on which the royalties shall not estop the Government at any time from contesting the enforceability, validity or scope of, or title to, any patent under which a royalty or payments are made.

84. FAR 52.222-4 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT - OVERTIME COMPENSATION (MAR 1986)

(a) Overtime requirements. No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics (see Federal Acquisition Regulation [FAR] 22.300) shall require or permit any such laborers or mechanics in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than 1 1/2 times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(b) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set

forth in paragraph (a) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the provisions set forth in paragraph (a) of this clause in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in paragraph (a) of this clause.

(c) Withholding for unpaid wages and liquidated damages. The Contracting Officer shall upon his or her own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same Prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in paragraph (b) of this clause.

(d) Payrolls and basic records.

(1) The Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of contract work and shall preserve them for a period of 3 years from the completion of the contract for all laborers and mechanics working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Nothing in this paragraph shall require the duplication of records required to be maintained for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act.

(2) The records to be maintained under paragraph (d)(1) of this clause shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit such representatives to interview employees during work hours on the job.

(e) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the provisions set forth in paragraphs (a) through (e) of this clause and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the provisions set forth in paragraphs (a) through (e) of this clause.

85. DEAR 970.5204-58 WORKPLACE SUBSTANCE ABUSE PROGRAMS AT DOE SITES (AUG 1992)

(a) Program Implementation. The Contractor shall, consistent with 10 CFR part 707, Workplace Substance Abuse Programs at DOE Sites, incorporated herein by reference with full force and effect, develop, implement and maintain a workplace substance abuse program.

(b) Remedies. In addition to any other remedies available to the Government, the Contractor's failure to comply with the requirements of 10 CRF Part 707 or to perform in a manner consistent with its approved program may render the Contractor subject to: the suspension of contract payments, or where applicable, a reduction in award fee; termination for default; and suspension or debarment.

(c) Subcontracts.

(1) The Contractor agrees to notify the Contracting Officer reasonably in advance of, but not later than 30 days prior to the award of any subcontract the Contractor believes may be subject to the requirements of 10 CFR part 707.

(2) The DOE Prime Contractor shall require all subcontracts subject to the provisions of 10 CFR part 707 to agree to develop and implement a workplace substance abuse program that complies with the requirements of 10 CFR part 707, Workplace Substance Abuse Programs at DOE Sites, as a condition for award of the subcontract. The DOE Prime Contractor shall review and approve each subcontractor's program and shall periodically monitor each subcontractor's implementation of the program for effectiveness and compliance with 10 CFR part 707.

(3) The Contractor agrees to include, and require the inclusion of, the requirements of this clause in all subcontracts, at any tier, that are subject to the provisions of 10 CFR part 707.

Part III

List of Documents, Exhibits and Other Attachments

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Contract Notifications and Submittals	J	4

Department of Energy
Field Office, Albuquerque
Los Alamos Area Office
Los Alamos, New Mexico 87544

NOV 3 0 1992

CONTRACT DISTRIBUTION

Contract No. DE-AC32-93AL64100

	Executed	Conformed
Incorporated County of Los Alamos ATTN: County Administrator P.O. Box 30 Los Alamos, NM 87544	1	
James Gourdoux, LANL, MS-M718		1
Office of the Counsel, LAAO		1
Fire Department Official File	1	
Eloy M. Nunez, Fire Dept Contract Mgr., LAAO		1
Alfred Geoffrion, Administrative Branch, LAAO		1
ES&H BRANCH, LAAO		1
AMG/JLB FIRE SUPPRESSION, EMERGENCY MEDICAL AND RESCUE SERVICES, LOS ALAMOS, NEW MEXICO		
Financial Management Division, AL ATTN: Rosemary Herrera	1	

Received Date

Administrative Branch

LA

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INDSOW2

ATTACHMENT A

STATEMENT OF WORK

I. SERVICES TO BE PROVIDED

A. Work Scope

1. The Contractor shall provide personnel to operate the Department of Energy-owned Los Alamos Fire Department to provide fire suppression, emergency medical, fire prevention, and rescue services for the Los Alamos Fire Department Service Area.

B. Fire Suppression Services

1. The Contractor shall provide fire suppression services for the Los Alamos National Laboratory Fire Service Area (LANL-FSA) and the Municipal Development Area-Municipal Fire Services Area, and for brush and forest fires within the Los Alamos Fire Department Service Area. (See Attachment D). The Contractor shall not provide these services to areas outside the above-mentioned areas unless required by mutual-aid agreements to which the County or the DOE is, or becomes a party.

2. The Contractor shall provide these fire suppression services to meet the requirements of this contract, Federal Aviation Administration (FAA) regulations at 14 CFR Part 139 and 1500, as modified in Annex A to the Statement of Work, and NFPA Standards as applicable to emergency response.

3. The Contractor shall develop and submit to the Contracting Officer for approval personnel and equipment response procedures for all areas within the LANL-FSA within 30 calendar days after award of contract. The response procedures shall include a minimum of five (5) SCBA-equipped personnel and designated equipment to incidents within the LANL-FSA, except as otherwise approved by the Contracting Officer. The response procedures should take into account facility programmatic importance and hazards. In developing the response procedures, the Contractor shall take into account available personnel and equipment, overall needs throughout the Fire Department Service Area, and efficient use of personnel and equipment.

4. Response levels to incidents outside the LANL-FSA shall be determined by the Contractor or as set forth in mutual-aid agreements with local, Federal, State, other recognized agencies or communities.

C. Emergency Medical and Rescue Services

1. LANL-FSA Area - The Contractor shall provide emergency medical and rescue services, as set forth herein.

Medical services related to ambulance service shall be under the program direction of the ambulance service Medical Director. These services shall meet all standards required by DOE and as further outlined in New Mexico State General Order No. 35, and State Regulation No. 85-4 (HSED) may be amended from time to t time. Statutory authority for these regulations is contained in the Emergency Medical Services Act, Section 24-10B-1 to 10B-11, New Mexico Statutes Annotated, 1978, and Section 9-7-6, New Mexico Statutes Annotated, 1978.

2. All Other Areas - The Contractor shall provide a level of service which at a minimum complies with applicable federal and state laws, and local ordinances.
3. Personnel and Equipment Response - Responses to medical emergencies shall be based on requirements of the ambulance service Medical Director and comply with the requirements of the State of New Mexico license requirements. Responses to the LANL-FSA shall include at least two persons, one possessing qualifications of EMT-B and one EMT-I. Compliance with the EMT-B requirement shall be required upon award of the contract. Compliance with EMT-I

requirement shall be accomplished no later than one year after approval by the Contracting Officer of the implementation plan as described below. The Contractor shall submit a proposed plan for accomplishment of the EMT-I implementation requirement. The plan shall include tasks and milestones for accomplishment thereof. The plan shall be submitted to the Contracting Officer for approval no later than 30 calendar days after award of the contract. The Contractor shall submit a monthly report to the Contracting Officer reporting the status of actions taken to accomplish tasks in the plan.

4. Non-Emergency Services - The Contractor may provide medical transport services between treatment facilities in Los Alamos and nearby communities subject to the following restrictions:

   a. Services can be provided by standby equipment and off-duty personnel.

   b. The use of on-line equipment and on-duty personnel is authorized only when requested by medical authorities and the situation is life-threatening.

c. When on-line equipment and personnel are used for medical transport, it will be the responsibility of the Fire Department's senior person on duty to assure that adequate personnel remain on duty or are called to duty to provide the minimum manning levels set forth in the response procedures for fire suppression, emergency medical and rescue services.

5. Emergency Medical and Rescue Services Operating Procedures -

a. The Contractor shall develop and implement written operating procedures for emergency medical and rescue services to be provided by the Fire Department. The procedures shall cover equipment assignment to stations, personnel training; response manning, including personnel qualifications; guidelines for equipment dispatching within and outside the Los Alamos Fire Department Service Area; and billing and collection of ambulance and rescue services revenues. The operating procedures shall be submitted to the Contracting Officer within 90 calendar days after award of the contract and

shall be updated as required or as directed by the Contracting Officer.

D. Communications and Dispatch

1. The Contractor shall be responsible for the operation of all radio and telephone systems provided by the Government under this contract. In addition, the Contractor shall be responsible for the dispatch of equipment and personnel to emergencies. Written procedures shall be developed and implemented setting forth procedures to be followed by Fire Department personnel for receiving alarms, dispatching of equipment, and tracking and coordinating of the equipment after dispatching. The Contractor shall assure that communications equipment utilized by the Fire Department has the ability to contact other agencies within the Los Alamos Fire Department Service Area, and areas covered by mutual-aid agreements, including the ability to contact off-duty personnel. Communication and dispatch procedures shall be submitted to the Contracting Officer for approval within 120 calendar days after award of the contract.

2. The DOE will allow the Contractor the use of the LANL trunked radio system for responses to emergencies that fall within the scope of the contract.
3. The Contractor shall comply with the requirements of NFPA 1221, Installation, Maintenance and Use of Public Fire Service Communications Systems, and NFPA 72F, Installation, Maintenance and Use of Emergency Voice/Alarm Communications Systems in providing services as required by this contract.
4. The DOE will provide the Contractor with a temporary communications/dispatch facility to be located at Fire Station No. 2 or other mutually agreed location. The Contractor will be responsible for providing trained personnel to operate the facility. The DOE and the Contractor hereby agree to continue negotiations for the development of a plan for a combined Fire Department/Police dispatch center. The negotiations will address the location, staffing, equipment, facility, and funding required for the operation of each facility and the transition of the dispatch function from the temporary to the permanent facility.

T. ORGANIZATION AND MANAGEMENT

A. The Contractor shall develop and maintain an organization to efficiently and effectively meet the staffing requirements of the contract.

B. The Contractor shall prepare an organization chart that shows lines of authority and relationships of the Contractor's organizational structure that provide direct and indirect support to the Fire Department The chart should also include outside organizations such as other fire departments which provide support pursuant to mutual-aid agreements, other DOE contractors such as the University of California, and the Forest Service. Additionally, the Contractor shall prepare an organization chart which depicts the line functions of each position, and lines of authority of all positions assigned to the Fire Department. The organization chart shall be supported by a narrative statement which describes the function, responsibility, and authority of each position assigned to the Fire Department.

C. Prior to implementing any permanent changes to the Fire Department organization, the Contractor will submit for the Contracting Officer's approval, any proposed revisions to the approved organizational structure, organization chart and narrative and obtain written Contracting Officer approval for the proposed revisions.

D. In order to maintain authorized staffing levels, the Contractor can request approval from the Contracting Officer to exceed the authorized FTE levels at the time recruitment is made to fill vacant positions. The numbers of personnel to be recruited which exceed the authorized FTE levels will be based on projections based on attrition rates or other factors as authorized by the Contracting Officer.

II. BUDGETING AND COST MANAGEMENT

A. BUDGET -

1. Annually the Contractor shall prepare and submit for Contracting Officer approval a budget consistent with the Government's fiscal year, which begins on October 1 and ends on September 30 of the following calendar year. The budget shall be submitted to the Contracting Officer no later than September 30th of each year and shall cover the fiscal year starting on October 1 of the next fiscal year and the two following fiscal years. For example, the submission for FY 1994 will include FY 1995 and FY 1996 and would be submitted by September 30, 1993. The budget shall be prepared in a line-item type of format as approved by the Contracting Officer. Each line-item in the budget shall be supported by a narrative description for each type of cost item that makes up each

individual line of the budget. The budget shall include all work to be performed which will be funded by for operating expense, capital equipment and capital plant type funding. The requirements of Order DOE 5100.3, Planning, Programming and Budgeting, shall be followed in preparing the budget.

2. The budget shall be updated by the Contractor as requested by the Contracting Officer. The updates shall reflect the actual costs incurred by the Contractor for each of the previous periods of the fiscal year and the Contractor's projections for the remainder of the fiscal year.

   Increases or decreases of the amounts for any of the line-items shall be supported by reasons causing the variances. Projected overruns or any of the line-items that exceed 10% of the line-item amount or $50,000, whichever is less, shall be reported to the Contracting Officer in writing immediately upon discovery of the projected overrun. The Contractor shall establish a system that will enable the development of budget projections and tracking of costs for each line-item in the budget on a minimum of a monthly basis or as required to provide budget and cost control of funds.

B. COST MANAGEMENT -

1. The Contractor shall implement a cost management system that will enable each Contractor element or organization to charge costs for expenditure of funds to each applicable line-item of the budget. The system shall be submitted to the Contracting Officer for approval within 180 calendar days after award of this contract.
2. The cost management system shall allow coding by an originator of a fund expenditure request, such as purchase and work orders, contract, etc., and approval of the coding and fund expenditure by a person designated by the Contractor to approve the expenditure. The cost management system shall have a tracking system that can account for all funds expended on a given order. The Contractor shall provide the Contracting Officer a monthly report which shows the fund status on a predetermined cut-off date of each month. The report shall show a description of the expenditure, amount of funds committed, and funds costed or paid out. Costs shall be reported for each line-item and sub-item in the approved budget. The report shall be submitted to the Contracting Officer no later than 30 calendar days following the end of each month.

3. The Contracting Officer will provide the Contractor with budget and cost information on Government-furnished property and services. The type and frequency of information to be provided will be mutually determined by Contracting Officer and the Contractor.

IV. PERSONNEL MANAGEMENT

The Contractor shall develop and implement a plan for personnel management of all Fire Department personnel which, at a minimum, covers the following areas:

1. Organization for personnel management
2. Position classification and job analysis
3. Compensation and benefits
4. Human resource planning
5. Equal employment and affirmative action
6. Recruitment and selection
7. Personnel assignments
8. Performance appraisal
9. Personnel development

In development of the personnel plan, the Contractor shall incorporate applicable requirements of this contract. Submission of the plan for Contracting Officer approval shall be 60 calendar days after award of the contract.

V. SECURITY PLAN-

The Contractor shall develop a Security Plan to assure that persons not possessing a DOE "Q" clearance are not allowed access to classified matter or special nuclear material. See Contract Clauses entitled DEAR 952-204.2 , Security Requirements and DEAR 952.204-70, Classification. The Security Plan shall set forth the procedures that will be used by the Contractor to comply with the requirements of the referenced clauses. The Plan shall be submitted to the Contracting Officer for approval 30 calendar days after award of the contract.

VI. PROPERTY MANAGEMENT

A. Property Management System - The Contractor shall develop and implement a system to track, inventory, report, and maintain all Government property as defined by the Contract clause entitled "Government Property (Cost Reimbursement, Time-and Materials, or Labor-Hour Contracts)" to be used by the Contractor in performing work as required by the contract. The system shall be in writing and shall as a minimum set forth procedures for:

1. Accountability of property
2. Inventory management
3. Responsibility for protection and safeguarding

4. Utilization/Disposal

5. Identification

6. Maintenance

7. Records/reporting

8. Inspection

9. Loan policy

B. Property Management Program Plan - A Property Management Plan which sets forth the Contractor's property management system shall be submitted to the Contracting Officer for approval within 180 calendar days after award of this contract.

C. Personal Property Controls -

1. Non-capital equipment

a. Non-capital equipment is defined as those items of nonexpendable personal property with a unit acquisition cost of between $1,000 and $4,999 and having a life of one year or more.

b. Property management information is to be maintained to support interrelated systems and programs such as maintenance, calibration, equipment pools, inventory, loans, storage, and excess reporting.

c. Acquisition value shall be available to support reporting of the equipment through the disposal process.

d. Each item of equipment shall be identified as U. S. Government property by a tag or marking and shall be assigned a specific property control number.

2. Sensitive Items

a. Sensitive items are those items of property, regardless of value, which are considered to be susceptible to being appropriated for personal use or which can be readily converted to cash; for example: firearms, portable photographic equipment, binoculars, portable tape recorders, portable calculators, and portable power tools.

b. The Contractor shall evaluate items in the $1,000-$4,999 range which should be added to the sensitive items list. Examples of these items include personal computer units and associated components, computer software, radios, electronic equipment, etc.

c. Non-sensitive property management record data similar to that used for non-capital equipment shall be established.

d. Each item of equipment shall be identified as U.S. Government property by a tag or marking and shall be assigned a specific property control number.

3. Capital Equipment

a. Capital equipment is defined as those items of nonexpendable property with a unit acquisition cost of $5,000 or more.

b. The Contractor shall include in the property management system procedures to record information, system data, property accountability, policies, etc., to meet the requirements set forth in the AL Property Management Instructions.

c. Each item of equipment shall be identified as U.S. Government property by a tag or marking and shall be assigned a specific property control number.

4. Motor Equipment (Vehicles)

a. The Contractor shall develop policies and procedures for economical and efficient management and control of Government-owned motor vehicles and motor vehicles rented or leased to the Government, including report-registration, official use, and identification to comply with the applicable requirements of Federal Property Management Regulations, Part 101.38, Sub-chapter G, and Department of Energy Property Management Regulations, Subchapter G, Transportation and Motor Vehicles.

b. Each vehicle shall be identified as U.S. Government property by a tag or marking and shall be assigned a specific property control number.

C. Real Property

1. The terms real property and real estate are synonymous and are defined as land and anything permanently affixed to the land such as buildings, fences, and those things attached to buildings such as lighting fixtures, plumbing and heating fixtures, etc.
2. The Contractor shall develop and implement a real property management system to administer, inventory, and report real property provided by DOE to the Contractor, to meet the requirements of Order DOE 4300.1B, Real Property and Site Development Planning.
3. The Contractor shall develop and implement a maintenance management program to meet the requirements of Order DOE 4330.4A, Real Property Maintenance Management and Order DOE AL 4330.4A, Maintenance of Property.

VII. TRAINING AND PROFESSIONAL DEVELOPMENT

A. Training Program

1. The Contractor shall develop, implement, and administer training programs that will include a new hire

training program, an in-service training program, qualification levels, and a certification program for all levels of training.

2. The Contractor shall appoint a full-time Training Officer responsible for overseeing all training and training-related qualifications, certifications, records, and reports required by this contract.
3. The Contractor shall develop the following training programs to maintain the minimum required level of service:
   a. Management training for supervisory officers in accordance with NFPA 1021.
   b. Training for firefighters levels 1 and 2 shall meet NFPA 1001, Fire Fighter Professional Qualifications and requirements for Emergency Medical Technician, Basic (EMT-B), as set forth in the State of New Mexico Regulations Governing the Licensing of Emergency Medical Technicians.
   c. Fire Officer training which complies with the requirements of NFPA 1021, Standards for Fire Officer Professional Qualification, will be required prior to promotion into the officer ranks or before completion of the probationary period of the position.

d. Company training which includes fire fighting tactics and strategy, hose evolutions, salvage techniques, ladder drills, hazardous materials, live fire drills, mountain rescue, relay operations, aircraft crash fire rescue training, apparatus pump operators training, and familiarization with fire suppression and detection systems. Fire apparatus driver/operator professional qualifications shall in accordance with NFPA 1002. Airport firefighter professional qualifications shall be in accordance with NFPA 1003, and Federal Aviation Administration, regulations at 14 CFR Part 139.

e. Pre-incident training which provides a comprehensive working knowledge of building protection, including technical indoctrination of nuclear criticality, radiation protection, explosives, large electrical installations, and LANL experimental facilities. Approved pre-fire plans shall augment this training.

f. Emergency medical services training shall comply with requirements set forth in the State of New Mexico Regulations Governing the Licensing of Emergency Medical Technicians. Training level of Emergency Medical Technician-Basic (EMT-B) and/or

Emergency Medical Technician-Intermediate (EMT-I) as required.

g. Training on the safe and proper operation of vehicles by all personnel during normal and emergency use. As a major objective, a training program shall be established to minimize the incidence of injuries, vehicle accidents, and abuse of vehicles. Training shall comply with NFPA 1002 requirements.

h. Training for hazardous-materials response shall be in accordance with NFPA 471 and 472; and OSHA 29 CFR 1910.120. All Fire Department personnel who will respond to emergencies shall receive training to meet the OSHA first responder awareness and first responder operational levels as a minimum. The DOE will provide training, as required, for those responses to the LANL-FSA that involve specific types of hazardous materials that are unique to LANL operations.

i. Training for administrative and technical support personnel assigned to the Fire Department.

4. The Training Program shall be submitted to the Contracting Officer for approval within 60 calendar days after award of contract.

B. Training Records-

The Contractor shall establish and maintain training records and a certification program that will document specific qualifications and proficiency levels maintained for all personnel involved in fire suppression, emergency medical, and rescue operations.

C. Training Exercises-

The Contractor shall conduct exercises to assure competency in all assigned responsibilities, training, and qualification levels. In addition, the Contractor shall participate in exercises conducted by DOE for purposes of evaluating fire suppression, emergency medical, and rescue services response effectiveness. These exercises shall be conducted on at least a yearly basis and should cover all types of emergencies that the Fire Department responds to.

III. EMERGENCY MANAGEMENT

A. Incident Command System (ICS)

1. In connection with providing the services described herein, the Contractor shall implement an ICS. For incidents involving the LANL-FSA, the Contractor's ICS shall follow the basic fundamentals set forth in the LANL Emergency Response Plan which shall be based on and

consistent with the National Interagency Incident Management System. The Department of Energy will provide the necessary basic training and coordination with other DOE contractors at the LANL to allow the Contractor for the development of an ICS that will be consistent with all LANL organizations. The Contractor shall participate in the development and review, and concur with the approval of the LANL Emergency Response Plan.

2. In connection with responding to incidents within the LANL-FSA, if the Fire Department is the first responder on the scene, the Fire Department's ranking officer shall be the Incident Commander. Upon arrival at the scene of a higher ranking officer, Incident Command will be transferred as set forth in the Fire Department's ICS. The Fire Department's Incident Commander will remain in charge of an incident as long as the incident remains a fire, rescue or medical incident. If the incident involves hazards or requires resources other than those possessed by the Fire Department, then the Fire Department shall request that the LANL's Emergency Manager assume Incident Command. The Fire Department's ranking officer at the scene will remain in command of all the Fire Department's elements at the incident scene and will provide fire suppression,

emergency medical and rescue services as requested by the Incident Commander.

3. A written procedure to implement an ICS shall be developed to apply to all Contractor personnel involved in emergency operations. The procedures shall, as a minimum, identify training for emergency situations, safety, chain-of-command, and special hazards. The ICS procedures shall be submitted to the Contracting Officer for approval within 60 calendar days after award of the contract.

B. Occurrence Reporting -

The Contractor shall develop and implement occurrence reporting procedures that comply with the requirements of Order DOE 5000.3A, Occurrence Reporting and Processing of Operations Information. This requirement is applicable to all Fire Department facilities and operations covered by this contract. Submittal of the procedures is required 30 calendar days after award of contract.

IX. CONTINUITY OF OPERATIONS

A. In addition to complying with the requirements of the contract clauses entitled "Continuity of Services" and "Notice to the Government of Labor Disputes," the

Contractor shall take the actions required herein to assure a continuation of services under this contract. Any threat to the maintenance of required personnel staffing as a result of a potential or threatened work stoppage or other collective personnel actions shall be promptly reported to the Contracting Officer. The Contractor shall take all reasonable steps to minimize potential threats to operational continuity by providing for adequate planning and execution of emergency services.

B. The Contractor shall prepare a written Contingency Plan within 90 calendar days after award of contract and submit it to the Contracting Officer for approval. The Contingency Plan shall recognize all joint resources available to the parties of this contract, and shall address the Contractor's approach to providing critical services in the event of a work stoppage or labor dispute. In addition, the Contractor shall coordinate resources that could be provided by the DOE's contractors at the Los Alamos National Laboratory in preparation of the Contingency Plan. This Contingency Plan shall be updated periodically as deemed necessary or prudent by the contracting parties, and any changes to the Plan will be subject to the approval of the Contracting Officer.

C. When a strike or work stoppage is threatened or appears likely, the Contractor shall immediately provide the notice required above, and with the approval of the Contracting Officer, commence implementing necessary elements of the approved Contingency Plan.

X. PRE-FIRE PLANNING FOR FIRE SUPPRESSION

A. LANL-FSA Area. The Contractor shall implement a Pre-Fire Planning Program to develop and maintain pre-fire plans for incidents which the Fire Department responds to. A list of LANL Key facilities, in priority order, shall be provided to the Contractor by the Contracting Officer for development of pre-fire plans within the LANL-FSA.
The pre-fire planning shall include development of plans for wild-land fires and support provided by Fire Department to explosive or other LANL test programs.

B. All Other Areas. The Contractor shall develop pre-fire plans on a scope and frequency to be developed by the Contractor.

C. Two copies of all approved pre-fire plans and revisions thereto, for the LANL-FSA, shall be provided to the Contracting Officer for DOE use.

D. Each pre-fire plan within the LANL-FSA developed by the Contractor shall be submitted to the Contracting Officer for review. The Contractor shall protect all pre-fire plans as required by the assigned classification. All pre-fire plans within the LANL-FSA will, as a minimum, be handled as "Official Use Only" or Unclassified Controlled Nuclear Information (UCNI) documents.

E. A Pre-Fire Planning Program Plan shall be developed by the Contractor and submitted to the Contracting Officer for approval within 30 calendar days after award of the contract. The Contractor shall update the Plan as required to reflect any proposed changes to the Plan or as directed by the Contracting Officer.

XI. MUTUAL-AID AGREEMENTS

A. DOE is a party to one mutual-aid agreement--Memorandum of Agreement for Mutual Fire Protection, MOU DE-GB32-89AL57296. The Contractor shall be responsible for complying with DOE's commitments of this mutual-aid agreement as they apply to the services provided by the Fire Department.

B. During the term of this Contract, DOE may enter into additional mutual-aid agreements for which responsibility will be assigned to the Contractor under this contract, or the Contractor may, with DOE's approval, enter into

mutual-aid agreements which will be carried out as part of the contract work. The parties will determine, at the time such agreements are entered into, whether they constitute a change to the contract requiring an adjustment in the estimated price of the Contract.

C. It is contemplated by the parties that the Contractor will enter into mutual-aid agreements with local governments, federal agencies, Indian Pueblos, or other entities whose jurisdictional authority is adjacent to the Los Alamos Fire Department Service Area, when DOE determines that such mutual-aid agreements will enhance the services required under this contract and will not interfere with the performance of services to the LANL-FSA.

D. In connection with any existing or future mutual-aid agreement, which may involve work whose costs are allowable under this contract, the Contractor shall obtain the prior written approval of the Contracting Officer before carrying out any of the following actions:

1. Conducting discussions or negotiating with the objective of entering into an agreement;
2. Executing an agreement; or
3. Providing any services pursuant to an existing, DOE-approved agreement which are not expressly required by the agreement.

XII. NON-EMERGENCY SERVICES

A. Fire Hydrant Flow Testing

1. LANL-FSA Area - The Contractor shall provide annual flow testing of all fire hydrants located on DOE property, and those used to protect property which DOE leases within Los Alamos County, in accordance with NFPA 291, latest edition. The reports of these flow tests shall be delivered to the Contracting Officer within 30 calendar days of completion of the tests.
2. All other areas of Los Alamos County - The Contractor shall determine the scope for testing of fire hydrants on Los Alamos County property, and comply with those requirements as necessary.
3. The Contractor shall develop and implement written procedures for fire-hydrant testing to be used by the Fire Department to comply with this requirement and submit to the Contracting Officer for approval within 45 calendar days after award of the contract.

B. Standby Services

1. Los Alamos Airport - The Contractor shall comply with applicable Federal Aviation Administration (FAA), 14 CFR PART 139, Regulations for General Aviation

Activities and shall comply with applicable FAA, DOE, or Department of Defense (DOD) directives and regulations for specialized support for special cargo flights to suppress any fire or accomplish any rescue from take-off or landing operations.

2. LANL-FSA Area - The Contractor shall provide stand-by personnel and equipment for specific activities as deemed necessary and requested by the Contracting Officer.
3. All Other Areas - The Contractor shall provide standby personnel and equipment for specific activities as deemed necessary by the Contracting Officer.

C. Non-Emergency Alarms - The Contractor shall respond to non-emergency alarms (automatic fire protection system supervisory and trouble alarms), within a reasonable period of time, normally not to exceed fifteen (15) minutes.

D. Fire Evacuation Exercises - The Contractor shall provide personnel and equipment for building evacuation exercises at the LANL-FSA on an on-call basis subject to availability of personnel and equipment when authorized by the Contracting Officer.

E. Fire Prevention Services - The Contractor shall provide fire prevention services for the Municipal Development Area and shall ensure that this service is provided in accordance with applicable federal and state and local ordinances; provided, however, that with respect to local ordinances, it is understood and agreed that DOE will not reimburse the Contractor for the salaries of any personnel whose sole function is that of inspection pursuant to existing local ordinances, but that within the staffing levels agreed to, these personnel may carry out inspection duties to fulfill the requirements of existing local ordinances as adjunct duties to the duties required under this contract.

OPERATIONAL PROCEDURES

A. GENERAL - The Contractor shall develop and implement procedures to be used for the daily operations of the Fire Department. These procedures shall set forth how the Fire Department operations will be managed, organized, and conducted to assure compliance with requirements of this contract.

B. In the development of these operational procedures, the Contractor shall utilize specific procedures developed by the Contractor in meeting the requirements of this

contract. In addition, applicable requirements of Order DOE 5480.19, Conduct of Operations Requirements for Facilities, shall be used as a guideline to assure that the conduct of operations meets DOE guidelines and that adequate written documentation exists to demonstrate the Contractor's conformance to these requirements.

C. Procedures developed to meet the requirements of this section shall follow a standard format. The procedures shall be placed in a loose-leaf type binder so that revisions or additions may be made as they occur. Each procedures manual shall be controlled. A procedure shall be established to keep track of manuals and distribution of changes thereto.

D. Electronic versions of the manual that can be used by MS-DOS personal computers will be developed by the Contractor at the earliest time possible.

IV SELF-ASSESSMENT PROGRAM

A. The Contractor shall develop and implement a self-assessment program to provide a means for the assessment of the overall performance of the Fire Department and the Contractor's support functions as they apply to the Fire Department.

B. The Contractor shall establish, document, and implement a self-assessment program which includes a description of

each major fire department function to include managerial and operational functions. For each function, a list of criteria upon which an assessment can be based shall be developed. Criteria are to be objective and contain measurements which can be tracked over time. The Contractor shall develop an annual schedule of periodic evaluations, at least one per quarter, covering each function during the year. The Contractor shall review and modify, as needed, functions and criteria prior to producing the upcoming year's schedule. Each functional area shall contain measurements; however, each individual criteria does not necessarily have to include measurements. The Contractor shall perform and document evaluations in accordance with the annual schedule, including problems not covered by a specific criteria. In carrying out evaluations, the Contractor shall utilize internal personnel not directly responsible for the given function, and shall rate overall performance in each function in accordance with the results. The Contractor shall gather managerial and affected operational representatives together following the evaluation to formulate corrective actions and look for opportunities for continual improvement. The Contractor shall document and perform corrective actions.

C. The proposed upcoming yearly program, and goals and accomplishments from the previous year shall be discussed with the Contracting Officer on a yearly basis.

ANNEX A TO STATEMENT OF WORK

DOE IMPLEMENTATION OF NFPA 1500, FIRE DEPARTMENT OCCUPATIONAL SAFETY AND HEALTH PROGRAM

The following sets forth the DOE requirements to be followed in implementing the requirements of NFPA 1500 to DOE facilities:

Section 2-1.1 The documents required by this Section need not be consolidated into a single document. In particular, Policy, Organization, and functional statements should be available for audit and be up to date. Training documents may consist of manuals, films, and other materials prepared by others and merely referenced in a training plan, or in functional statements.

Section 2-3. Where the fire department, or other fire-fighting organization, is part of a larger organization that provides the requisite "research, development, implementation, and enforcement of an OS&H program," the fire department program needs may be included within the larger program.

Section 2-4. A Safety Officer shall be designated for each organization. Where safety services, monitoring, training, etc., are provided by another on-site organization, or the parent organization, the person designated as the Safety Officer shall be responsible to coordinating the services required by the department.

Responsibility for safety at the first-response level shall be incorporated in the department's emergency procedures manual.

The fire department Safety Officer can be anyone in the organization who can show up on the scene, not necessarily with the first response, but must be someone other than the incident commander as the Safety Officer is intended to be an independent voice, advising the incident commander.

Section 2-5. The OS&H Committee may include representatives from other organizations when the department is part of a larger organization or at a site where safety services are provided by others. The required safety meetings may be joint meetings with others if the department's safety needs are amenable to joint meetings.

Section 2-6. The records required in this Section may be maintained by a parent or service organization as long as they are auditable and are available to the department.

Section 2-6.2. The department shall have a procedure for reflecting possible exposures in the incident files and individual medical records.

Section 3-1.4. The requirement for training and education is considered to require that all firefighters must be trained in the hazards to be encountered at the scene of an incident before they can participate in active operations requiring such training.

Section 3-1.5. The individuals providing the training and education need not be members of the fire department, but they should be knowledgeable in the area of instruction as it relates to the fire service.

Section 3-1.6. Training Officer qualifications may be met by either compliance with the stated NFPA 1041, or by obtaining local or state certification.

Section 3-3.2. All personnel assigned to structural firefighting positions shall receive training adequate to meet the Firefighter I qualification of NFPA 1001.

Section 3-3.3. Training programs for drivers/operators shall be designed to meet the intent of the referenced standard. It is understood that some licensing requirements will vary by states and/or type of equipment.

Section 3-3.4. All specialized training programs, i.e., fire officer, driver/operator, airport firefighter, shall be developed and implemented within each organization. This shall be so accomplished as to meet the intent of the appropriate NFPA Standard.

Section 3-4. Training in fire ground operations shall be based on accredited systems, such as those provided by the International Fire Service Training Association manuals, official state training manuals, etc.

Section 3-5. Because of the specialized operations and hazards peculiar to most DOE sites, these "special hazards" training requirements are of prime importance. Training should include not only the nature of the hazards, but familiarization with the protective systems employed, the monitoring and alarm systems peculiar to the operation, and the support services provided by other parts of the site organization in monitoring or alleviating an emergency situation.

Section 4-2.1. Drivers of fire department vehicles shall receive special training in the operation of the vehicle and must be certified and/or licensed, as appropriate, or as required by the State to operate fire department vehicles.

Section 4-2.4. An exception to the requirement is the rear attendant of an ambulance when actively attending to a patient. This exception shall stand until such time as acceptable safety restraints are available for the rear ambulance attendant.

Section 4-3.1. An exemption may be granted for some site-specific vehicles, such as golf cart-type vehicles used within building to deliver supplies and equipment and automatically restricted in maximum speed. However, any such exemptions must be reviewed and approved by the Safety Officer and documented in the department files.

All present and future acquisitions of used apparatus shall be brought up to the minimum standards for safety seating requirements.

Section 4-5.4. For ladders, see the Interpretation Note on NFPA 1932. (All test conditions are required except that the annual test requirement may be changed to not less than every five years. All other conditions noted as requiring the test are unchanged).

Section 5-1.1. As a clarification, all equipment must be available and donned before the individual participates in any evolutions requiring protective clothing use. It is not necessary for each member of a department or brigade to have a full set of all protective clothing as long as supplies for the anticipated needs can be delivered to the point of use in adequate quantities and sizes for anticipated needs and without incurring undue delay in the emergency response.

All new equipment needed to fulfill the requirements of his Section shall be procured by the end of FY 1990.

Section 5-2.7. The fire resistance of work station uniforms should be considered in applying this Section. Where firefighting is provided by personnel who have other primary jobs, such as in most fire brigades, the provisions of NFPA 1975 need not be applied to their work clothing. However, any exceptions to the requirement should be reviewed by the Safety Officer and exception documented in the department records. Training needs and turnout gear provisions should take into account the clothing normally worn by responders.

Section 5-3.4.2. SCBA cylinders need not be emptied quarterly if not a requirement by the manufacturer/supplier.

Section 5-4.1. Personal Alert Safety Systems (PASS) need be provided only for people involved in interior firefighting or hazardous responses.

Section 5-5.3. Life safety ropes used for rescue shall be previously unused and shall be thoroughly examined upon completion of rescue in accordance with the manufacturer's recommendations. Ropes used for rescue shall remain in the custody of the original purchasing engine company or fire department. Records shall be kept, documenting the use, inspection, and inspector, immediately after each use and prior to any future use. The date and officer in charge will also be indicated on the records. All ropes leaving

the custody of the fire department must be destroyed, or otherwise prevented from being reused in life safety operations. Any indication of wear or shock loading will be justification to destroy said rope. Life safety ropes shall be completely dry and clean prior to restoring for use as life safety lines.

Section 6-1. Some of the requirements pertaining to emergency operations may be covered by a parent organization or be provided by other on-site organizations at DOE facilities. Health physics, for example, may provide the basic personnel required by Section 6-1.7 for radiological emergencies. All of the elements of Chapter 6, however, should be in place in the overall site plan. All emergency plans should clearly identify the incident commander for each type of emergency.

Section 6-2. The minimum response requiring interior firefighting or other operations requiring the entrance of SCBA-equipped people shall be 5 persons. When less personnel are available, interior operations shall not be attempted.

Section 6-3.2. Clarification. The requirement for personnel "standing by" does not mean the required people cannot be performing some other function, but they must be able to suspend what they are doing to provide the immedicate rescue efforts.

Section 6-3. The "standing by" requirement for qualified life support personnel may be relaxed if, in the Chief's opinion," qualified personnel are readily available and are dedicated to the site. (At a small site, it should not be necessary for medical/ ambulance personnel to respond on every incident).

CAPITAL EQUIPMENT

NON-CAPITAL EQUIPMENT AND

SENSITIVE ITEMS

(Incorporated here by reference is the "Semi-Annual Summary Report of DOE-Owned Plant and Capital Equipment - DOE Form 4300.3" for the period ending February 28, 1992.)

FACILITIES

REAL PROPERTY

(Incorporated here by reference is the "Semi-Annual Summary Report of DOE-Owned Plant and Capital Equipment - DOE Form 4300.3" for the period ending February 28, 1992.) In addition, attached are DOE/LAAO Fire Station Survey Maps, pages 1 - 7.

BASIS OF BEARINGS
FIRE STATION 1: N12° 23' 47"W AS ESTABLISHED
BY FOUND CONTROL POINTS DIAMOND 1 & DIAMOND 2 N.M.S.P. GRID
BEARING

FIRE STATION 2: BEARING OF N14° 57' 06"E AS ESTABLISHED BY THE FOUND SOUTHWEST CORNER AND FOUND NORTHWEST ANGLE POINT OF TRACT DD EASTERN AREA NO.2, SAID PLAT ON FILE AT THE LOS ALAMOS COUNTY COURTHOUSE.

FIRE STATION #3 PLAT BEARING AS ESTABLISHED BY FOUND CORNERS OF TRACT J.A. WHITE ROCK NEW MEXICO SAID PLAT BEING ON FILE AT THE LOS ALAMOS COUNTY COURT HOUSE.

FIRE STATION #4 PLAT BEARING AS ESTABLISHED BY FOUND CORNERS OF TRACT G, NORTH COMMUNITY NO.2: SAID PLAT BEING ON FILF AT THE LOS ALAMOS COUNTY COURT HOUSE.

FIRE STATION NO.5: GRID BEARING OF N43° 56' 52"E AS ESTABLISHED BY FOUND BRASS CAPS 1440 AND 1441 OF THE LOS ALAMOS TECHNICAL AREAS.

NOTES: WALKS SHOWN ON ENG-C-7108 HAVE BEEN OVERLAID WITH ASPHALT.

UTILITIES SHOWN ARE BASED ON EXISTING SURFACE FEATURES AND ARE APPROXIMATE ONLY. ALL UTILITY LOCATIONS MUST BE FIELD VERIFIED PRIOR TO ANY EXCAVATION OR CONSTRUCTION.

NOTE: UNDERGROUND UTILITIES ARE SHOWN FOR INFORMATION ONLY. FIELD VERIFY PRIOR TO ANY EXCAVATION OR CONSTRUCTION.

Pan Am World Services, Inc. P.O. Box 50 Los Alamos, N.M 87544-0050

PROJECT DOE/LAAO FIRE STATION SURVEY

DESCRIPTION LEGEND

SHEET 2 OF 7

DATE 3 / 15 / 88

JOB NO 88-022

BY APPR

LEGEND

—E—	OVERHEAD ELEC.		GAS VALVE
—SS—	SEWER		ASPHALT
	PROPERTY		CONCRETE
	VALVE	VCP	VITRIFIED CLAY PIPE
	SET PROP. BOUNDARY		FLAG POLE
	CLEANOUT	EP	ELEC. PANEL
	PROPERTY BOUNDARY	DR	DRAIN
	TEL RISER	C.O.	CLEANOUT
	PINON OR PINE	G.M.	GAS METER
	MANHOLE		ANTENNA MAST
—W—	WATER	R. W.	RETAINING WALL
—UE—	UNDERGROUND ELEC.	M.P.	METER PIT
—PP—	POWER POLE	STM	STEAM
—G—	GAS	S.D.	STORM DRAIN
—o—o—	FENCE	T	TELEPHONE LINE
	FIRE HYDRANT		

Pan Am World Services, Inc. P.O. Box 5 Los Alamos, N.M. 87544-0050

PROJECT DOE/LAAO FIRE STATION SURVEY

DESCRIPTION FIRE STATION # 1 TA-3

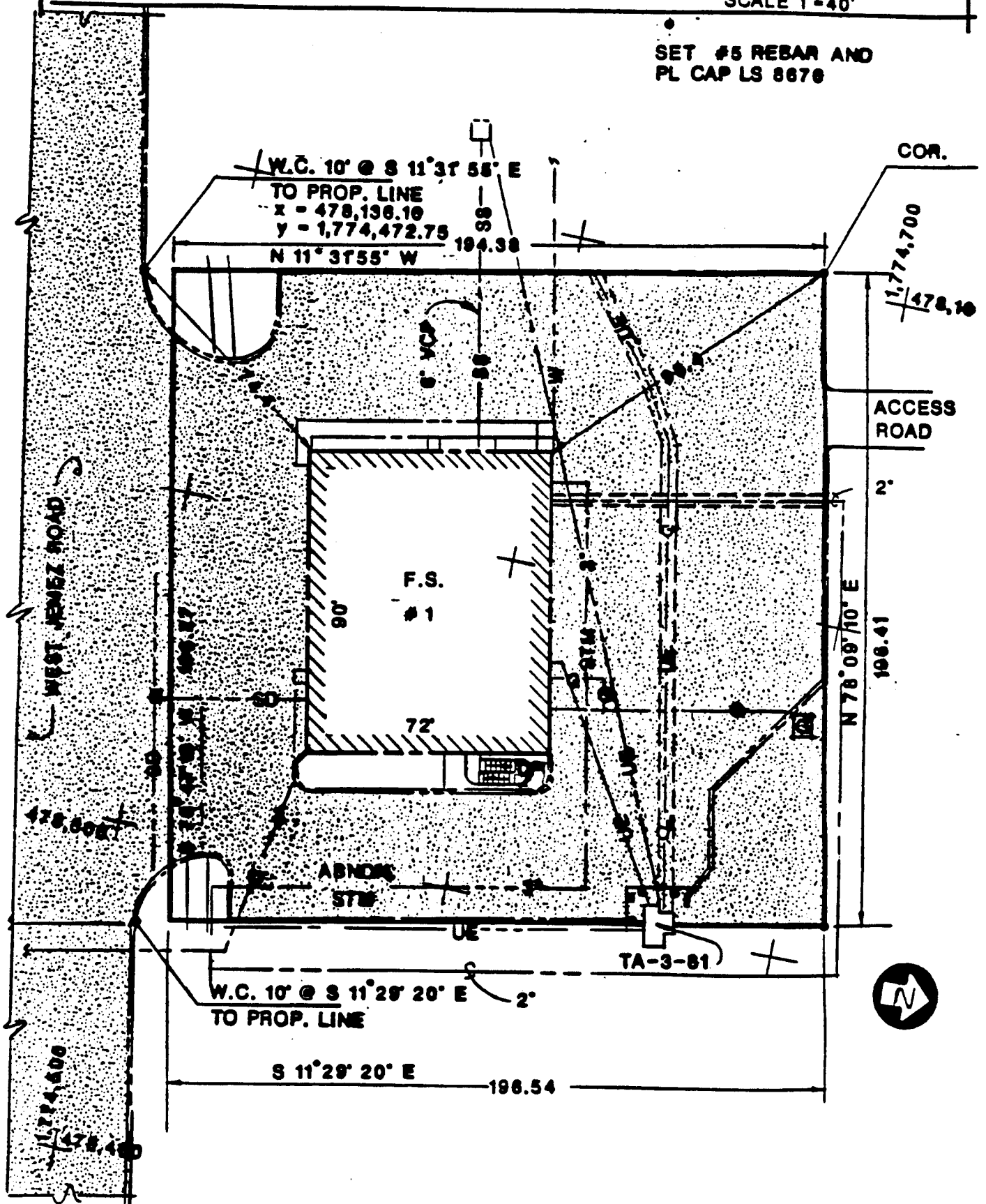
SHEET 3 OF 7

DATE 3 / 15 / 88

JOB NO. 88-022

BY MASCAREÑAS APPR. CT

SCALE 1"=40'

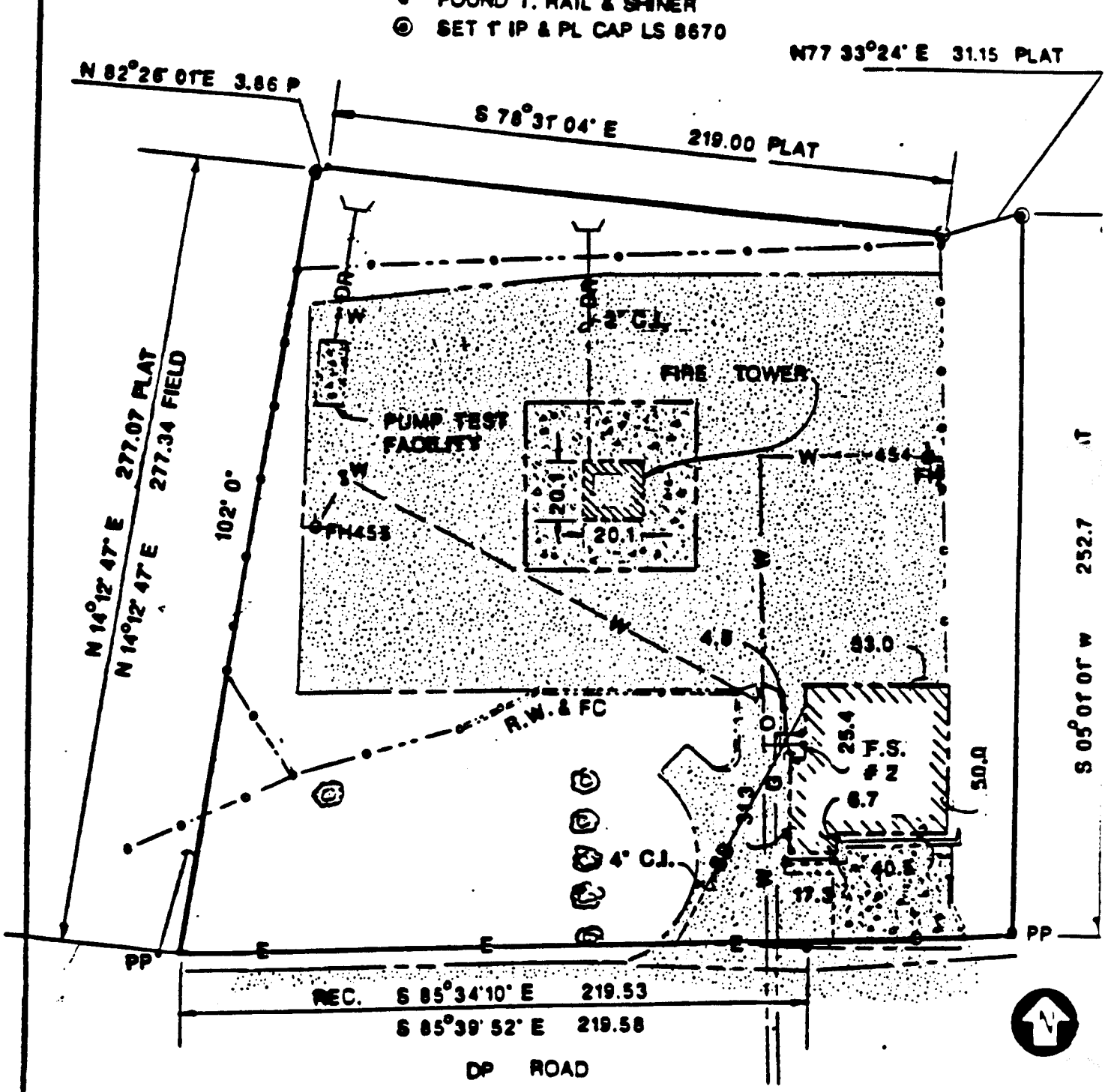


Pan Am World Services, Inc. P.O. Box [illegible] Los Alamos, N.M 87544-0050

PROJECT DOE/LAAO FIRE STATION SURVEY

DESCRIPTION FIRE STATION # 2 DP ROAD

SHEET 4 OF 7
DATE 3 / 15 / 88
JOB NO 88-022
BY [illegible] APPR C.T.
SCALE 1" = 50'



CURVE DATA
A= 04 15' 34" LT
R= 1021.74
T= 38.00
e= 75.96

Pan Am World Servicr Inc. P.O. Box 5 Los Alamos, N.M. 87544-0050

PROJECT DOE/LAAO FIRE STATION SURVEY

SHEET 5 OF 7

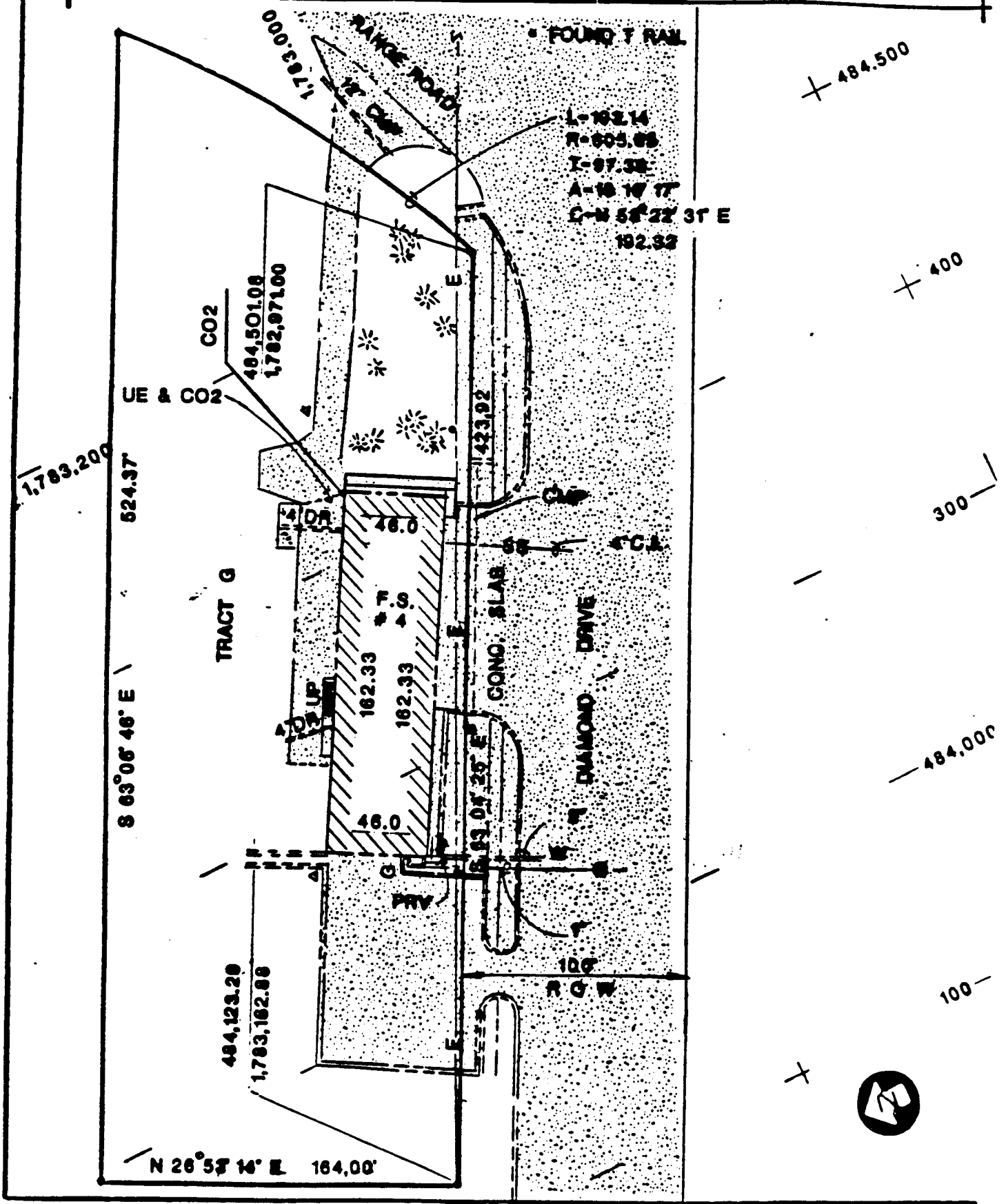
DATE 3 / 15 / 88

DESCRIPTION FIRE STATION #4 4401 DIAMOND DRIVE

JOB NO. 88-022

BY MOSCARELLAS APPR. Z.

SCALE 1"=60'



Pan Am World Servi , Inc. P.O. Box Los Alamos, N.M. 87544-0050

PROJECT DOE/LAAO FIRE STATION SURVEY

SHEET 6 OF 7

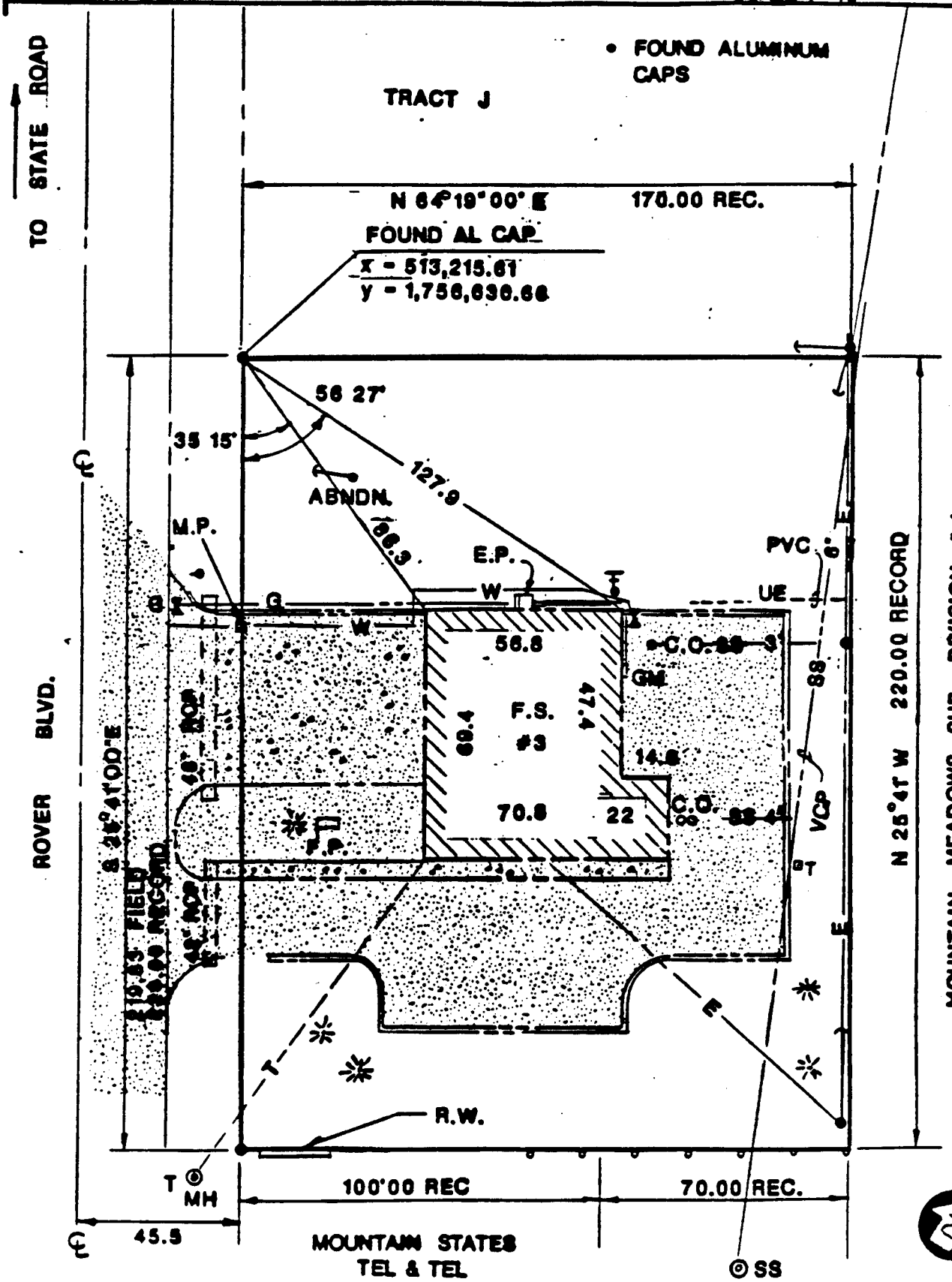
DATE 3 / 15 / 88

DESCRIPTION FIRE STATION #3 WHITE ROCK

JOB NO. 88-022

BY MASCARENAS APPR. CT

SCALE 1"=40'



Pan Am World Service Inc. P.O. Box 5 Los Alamos, N.M. 87544-0050

PROJECT DOE/LAAO FIRE STATION SURVEY

SHEET 7 OF 7

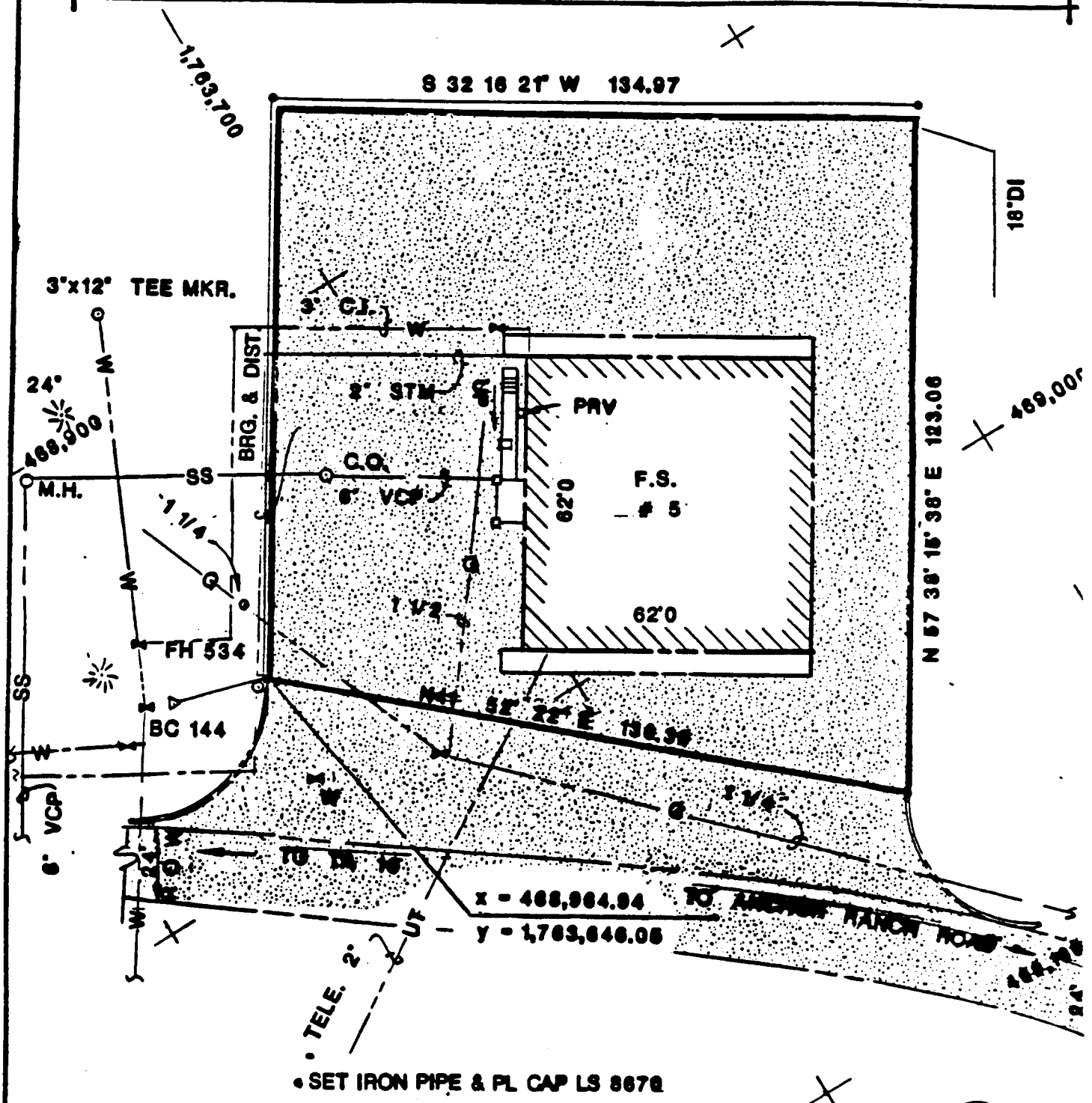
DATE 3 / 15 / 88

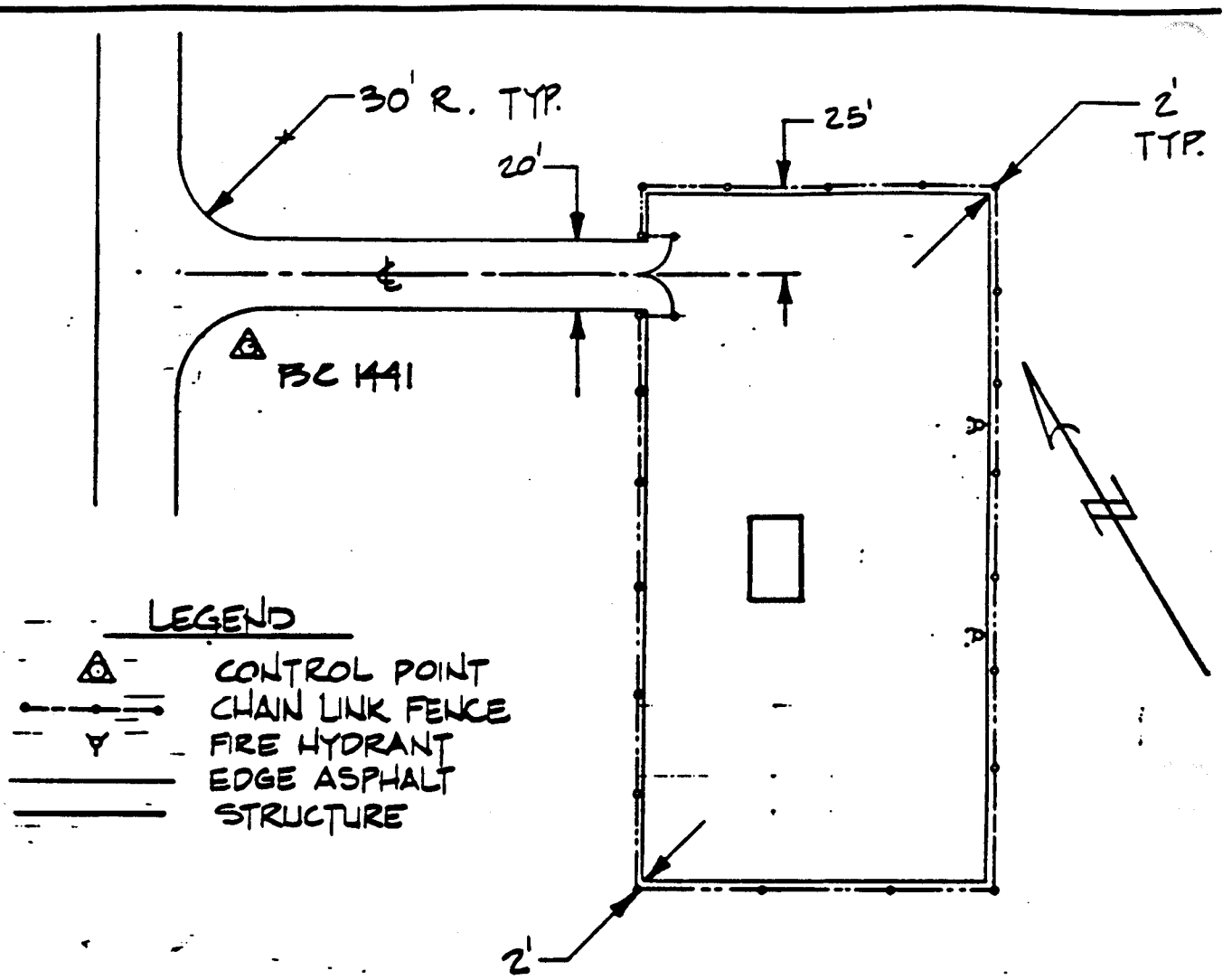
DESCRIPTION FIRE STATION # 5 TA-16

JOB NO. 88-022

BY MASCARENAS APPR. C.T

SCALE 1"=50'





NOTES

1) BASIS OF BEARING
N 43° 56' 51.5" E AS ESTABLISHED △ CONTROL POINT BY FOUND BRASS CAPS 1440 & 1441.

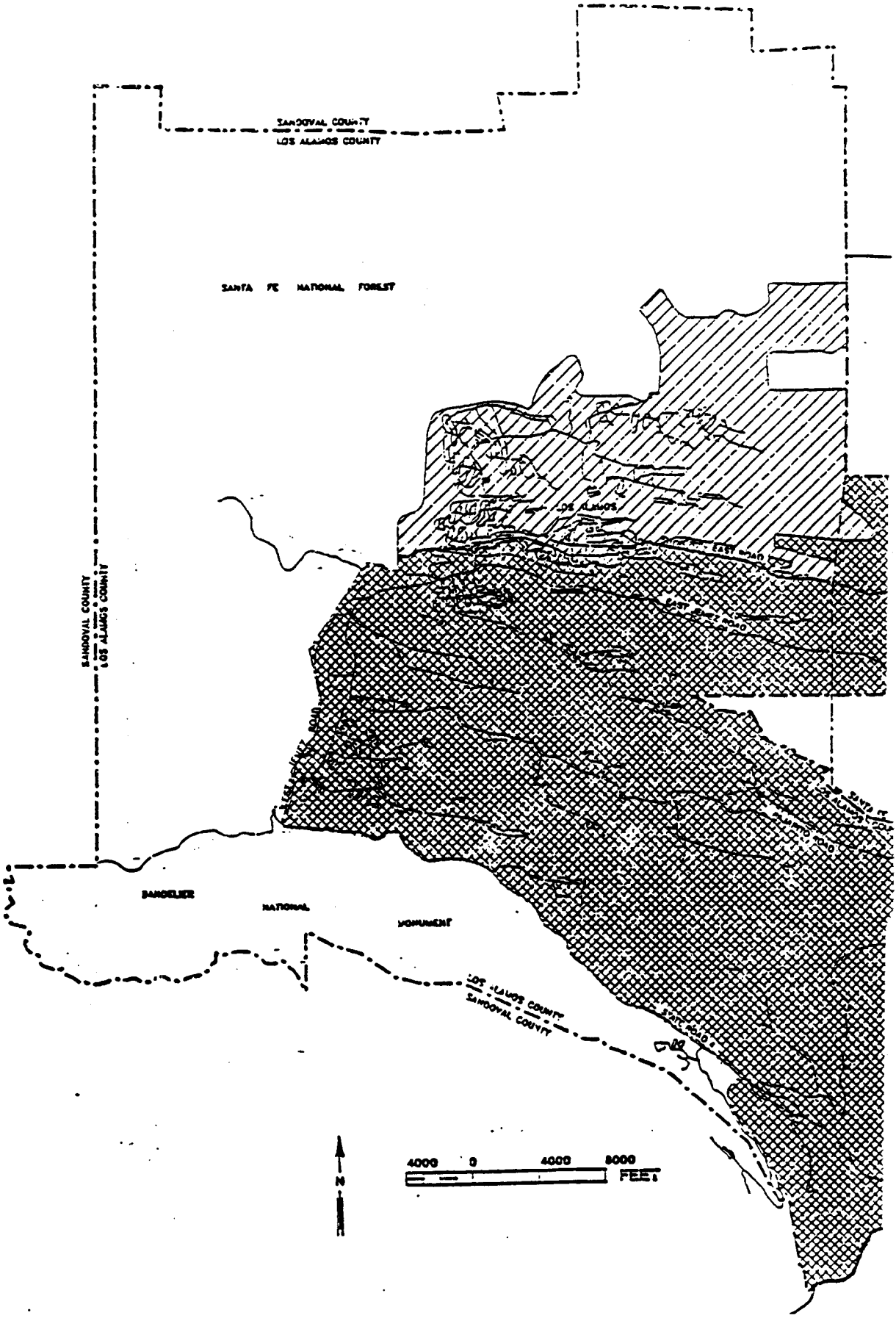
2) LOCATION OF BUILDING & FIRE HYDRANTS ESTABLISHED FROM AS BUILT DRAWING SINCE ACCESS TO SITE WAS LIMITED AT TIME OF SURVEY.

PAN-AM SURVEY DEPARTMENT
FIRE TRAINING CENTER TA-16
W.O. # 7314-99 DRAWN BY: JAMES A. CATA SCALE: 1" = 50' SHT 1 OF 1

LOS ALAMOS FIRE DEPARTMENT

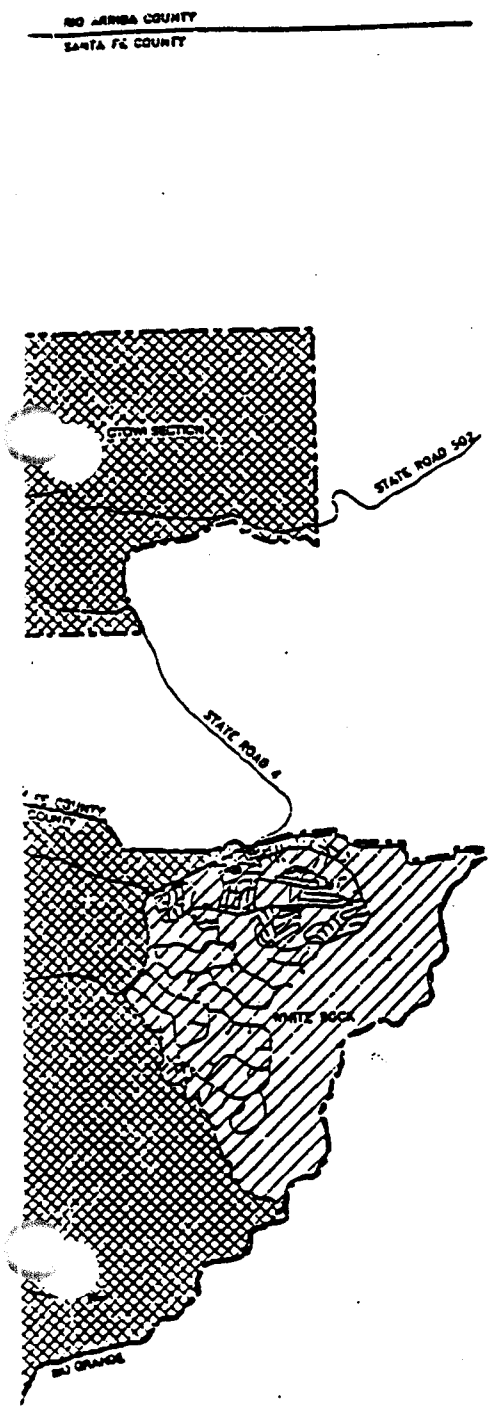
FIRE SERVICE AREA

ATTACHMENT D


SANDOVAL COUNTY
LOS ALAMOS COUNTY
SANTA FE NATIONAL FOREST
SANDOVAL COUNTY
LOS ALAMOS COUNTY
LOS ALAMOS
EAST ROAD
BANDELIER
NATIONAL
MONUMENT
LOS ALAMOS COUNTY
SANDOVAL COUNTY
N
4000 0 4000 8000
FEET

LEGEND

- MUNICIPAL DEVELOPMENT AREA - MUNICIPAL FIRE SERVICES
- LOS ALAMOS NATIONAL LABORATORY - FIRE SERVICE AREA
- LOS ALAMOS FIRE DEPARTMENT, EMERGENCY MEDICAL AND RESCUE SERVICE AREA



NO.	DATE	CLIENT REV.	REVISIONS	DWN	DES	CHKD	ENG	SUB	PLC
1	3/1/91		REVISE TITLE						

FACILITIES ENGINEERING DIVISION

LOS ALAMOS FIRE DEPARTMENT SERVICE AREA

BLDG.

DRAWN
DESIGN
CHECKED
RELEASED
DATE 11/16/90

SUBMITTED RECOMMENDED APPROVED

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET 1 OF 1

CLASSIFICATION UL REVIEWER

LAC JOB NO.

DRAWING NO. ENG-R 7151

REV.

LISTING OF DOE OWNED STRUCTURES

LISTING OF DOE LEASED STRUCTURES

The attached is a list of DOE owned structures and leased facilities outside of the main boundary of the Laboratory. This listing is subject to change.

DOE OWNED STRUCTURES

TA	BLDG	NAME	ADDRESS
0	71	Pumphouse, Water	Western Area, Los Alamos
0	1054	Well House #1	Guaje Canyon
0	1055	WellHouse #1	Guaje Canyon
0	1051	Steam Plant	3750 Finch St., Los Alamos
0	1056	Metering Station	1805 Diamond, Los Alamos
0	1058	Well House	Rendija Canyon
0	1061	Transmitter Bldg.	Star Lake
0	1062	Laborers Shack	SE Side TA-3, SM-36
0	1078	Sportsman Club	Rendiji & Gauje Canyon
0	1079	Valve House	1805 Diamond, Los Alamos
0	1080	Pump House	600 48th Street, Los Alamos
0	1082	Maintenance Bldg.	Gas Line, San Juan County
0	1084	Valve Bldg.	Gas Line, Sandoval County
0	1085	Valve Bldg.	Gas Line, Sandoval County
0	1086	Valve Bldg.	Gas Line, Sandoval County
0	1087	Valve Bldg.	Gas Line, Sandoval County
0	1088	Valve Bldg.	Gas Line, San Juan County
0	1089	Gas Valve House	691 East Road, Los Alamos
0	1090	Pumping Station	99 Gancho, Los Alamos
0	1091	Guard Tower	2471 East Rd., Los Alamos
0	1092	Booster Station	Guaje Canyon
0	1093	Booster Station	State Road 4
0	1094	Fire Station #4	White Rock
0	1095	Fire Station #2	132 DP Road, Los Alamos
0	1096	Fire Station #3	4401 Diamond, Los Alamos
0	1099	Booster Station	State Route 4
0	1100	Sand Basin Bldg.	Guaje Canyon
0	1101	Well House	Guaje Canyon
0	1102	Well House	Guaje Canyon
0	1103	Well House	Guaje Canyon
0	1104	Well House	Guaje Canyon
0	1105	Well House	Guaje Canyon
0	1107	Filter Building	4040 Diamond, Los Alamos
0	1108	Pumping Station	4084 Trinity, Los Alamos
0	1109	Booster Station	1801 Diamond, Los Alamos
0	1110	Valve House	601 48th, Los Alamos
0	1111	Pumping Station	600 48th, Los Alamos
0	1112	Booster Station	Guaje Canyon
0	1113	Booster Station	Guaje Canyon
0	1114	Booster Station	Guaje Canyon
0	1115	Metering Station	691 East Road, Los Alamos
0	1116	Drill Tower FS#2	132 DP Road, Los Alamos
0	1117	Well House	Guaje Canyon
0	1118	Well House	Guaje Canyon
0	1119	Well House	Guaje Canyon
0	1120	Well House	Guaje Canyon
0	1121	Well House	Guaje Canyon
0	1122	Valve House	Guaje Canyon
57		All Buildings	Fenton Hill

SMALL BUSINESS AND SMALL DISADVANTAGED

BUSINESS SUBCONTRACTING PLAN

ATTACHMENT F

SMALL BUSINESS AND SMALL DISADVANTAGED

BUSINESS SUBCONTRACTING PLAN

(Final November 12, 1992)

Los Alamos Fire Department
Incorporated County of Los Alamos
2300 Trinity Drive
Los Alamos, New Mexico 87544

Solicitation No. RP 32-91AL64100

The agreement between the Department of Energy (DOE) and the Incorporated County of Los Alamos (contractor or County)) provides for the County to be responsible for fire suppression, emergency medical and rescue services in the Los Alamos Fire Service Area, as defined in the contract, which includes Los Alamos National Laboratory.

The County and the DOE originally entered into a contract on February 9, 1988, to initiate the proposed transfer of the Los Alamos Fire Department from the DOE to the County. Phase II of this agreement, operation of the Fire Department, began September 24, 1989. Phase II, including current extensions, expires December 31, 1991. The DOE's request for proposal, RP 32-91AL64100, contemplates a subsequent five year contract with the County.

****

In accordance with Section 8(d) of Public Law 95-507, as implemented by OFPP Policy Letter 80-2, there are six mandatory elements that must be in every subcontracting plan. The six elements are:

I. **GOALS**

Goals for subcontracting with Small Businesses (SB) and with Small Disadvantaged Businesses (SDB) are expressed in both dollars and percentages. The percentage goal is a percentage of the total dollars planned for subcontracting, not the total dollar amount of the contract. The definition of a subcontract is any agreement the County (contractor) enters into for supplies and/or services required for contractor performance that will not be conducted with their own labor forces. (This includes agreements with Large Businesses [LB] as well as SB and SDB concerns.) Indirects and Overhead were not included in the amounts to be subcontracted.

Percentage Goals and Estimated Amounts:

A. 1. The total estimated cost of the proposed five year contract is $39,853,077.

2. The total estimated dollar value of all planned subcontracting under this contract is $3,327,718.

3. The following dollar and percentage goals (expressed in relation to the total planned subcontract dollars in A.2) are applicable to the contract cited above or to the contract awarded as a result of the solicitation cited.

(a) Small Business concerns: Total dollars planned to be subcontracted to small business concerns: $1,663,859. Fifty percent (50%) of the total planned subcontracting dollars under this contract goal will go to subcontractors who are SB concerns.

(b) Small Disadvantaged Business concerns: Total dollars planned to be subcontracted to SDB concerns: $399,326. This dollar amount is included in the amount shown under A.3(a), above, as a subset. Of the total planned subcontracting goal dollars under this contract, 12% will go to subcontractors who are SDB concerns owned and controlled by socially and economically disadvantaged individuals. This percentage is included in the percentage shown under A.3(a), above, as a subset.

B. 1. Subcontracting Summary: The following is a summary of subcontracting under this contract, with the distribution among SB, SDB and LB concerns as follows (SBP is the total dollar amount estimated for subcontracting):

Category	100% SBP	50% SB	12% SDB	50% LB
Services	$1,560,989	780,495	187,319	780,495
Supplies	1,428,945	701,437	168,345	701,407
Capital	363,855	181,927	43,662	181,927
Total	$3,327,718	$1,663,859	$399,326	$1,663,859

2. Possible Subcontractors: The following is a list of possible SB and SDB subcontractors for the Services, Supplies/Materials and Capital Equipment referenced in B.1 and B.2.:

Small Business Concerns:
A-1 Signs
Allied School and Office Products
ALS Medical Products
Armstrong Medical
Artesia Fire Equipment
Becker Fire Equipment
Bill's Computer Shop
Brownell's Hallmark Shop
Business Machines Center
C.J. Enterprises
Camelot World Travel
Camera and Darkroom
Central Motive Power
Clarey's Safety Equipment
Clement, Benner and Fox
Coffelt's Family Footwear
Computer Works (Las Cruces)
Dane Myers
Delta Uniform
Don Taylor's Photo
Dr. Victor Zalma
Finishing Touch
G.C. Video
Glovers Auto Parts
Hunter Lumber Company
Independent Fire Company
J & J Safety
Johnson Southwest Moving (Santa Fe)
Knecht Automotive
Kurts Camera Corral
Los Alamos Parts Company
Los Alamos Stationers
Metzger Stores
Michael W. Baxter, PH.D.
Microsage
Mobile Apparatus
Monarch Fire Equipment
Pajarito Travel Agency
Peak and Plains Outfitters
Precise Graphic Impressions
Rapids Air, Inc.
Red Barn Screen Prints
Simon's Uniforms
Thunderbird Shoe Store
United Fire Equipment

Small Disadvantaged Business Concerns:

Advanced Copy Systems (Santa Fe)
Agua Fria Wrecker Service
Ask Mr. Foster Travel
Capitol City Uniforms
Destinations, Inc.

Healy-Matthews Stationers
Holman's Inc.
Joann's Floral
Lobo Team Sales
Mr. Carpet
N.M. Office Products
N.M. Pest Control
Santa Fe World Travel
Sierra Vista Office Products

II. ADMINISTRATOR

The subcontracting plan is to be administered by the County (contractor) to assure that the provisions of the contract and the plan are implemented and performed.

The following individual will administer the subcontracting plan:

Name: Roger Bagley
Title: Support Services Director
Telephone: 662-8054

This individual's specific duties, as they relate to the County's (contractor's) subcontracting plan, are as follows:

A. General overall responsibility for the County's Small Business Program, the development, preparation, and execution of individual subcontracting plans and for monitoring performance relative to contractual subcontracting requirements contained in this plan, including but not limited to:

B. Developing and maintaining bidders lists of small and small disadvantaged business concerns from all possible sources;

C. Ensuring that procurement packages are structured to permit small and small disadvantaged to participate to the maximum extent possible;

D. Assuring inclusion of SB and SDB concerns in all solicitations for products or services that they are capable of providing;

E. Reviewing solicitations to remove statements, clauses,etc. that may tend to restrict or prohibit SB and SDB participation;

F. Ensuring that the bid proposal review board documents its reasons for not selecting low bids submitted by small and small disadvantaged business concerns;

G. Ensuring the establishment and maintenance of records of solicitations and subcontract award activity;

H. Attending or arranging for attendance of company counselors at Business Opportunity Workshops, Minority Business Enterprise Seminars, Trade Fairs, etc.;

I. Conducting or arranging for motivational training for purchasing personnel pursuant to the intent of P.L. 95-507;

J. Monitoring attainment of proposed goals;

K. Preparing and submitting periodic subcontracting reports as required;

L. Coordinating County activities during the conduct of compliance reviews by Federal agencies; and

M. Coordinating the conduct of County activities involving its small and small disadvantaged business subcontracting program.

III. OUTREACH EFFORTS

The following efforts will be taken to assure that small and small disadvantaged business concerns will have an equitable opportunity to compete for subcontracts:

A. Outreach efforts will be made as follows:

1. Contacts with minority and small business trade associations;

2. Contacts with business and development organizations;

3. Attendance at small and minority business procurement conferences and trade fairs; and

4. Sources will be requested from SBA's PASS system.

B. The following internal efforts will be made to guide and encourage buyers:

1. Workshops, seminars, and training programs will be conducted; and

2. Activities will be monitored to evaluate compliance with this subcontracting plan.

C. Small and small disadvantaged business concerns source lists, guides and other data identifying small and small disadvantaged business concerns will be maintained and utilized by buyers in soliciting subcontracts.

IV. SUBCONTRACTING PLAN FLOWDOWN

The subcontracting plan must include the County's (contractor's) explicit statement that the two standard subcontracting clauses will be included in all relevant subcontracts. The clauses must be included by title and the County guarantees that a "subcontracting plan" will be required of every subcontractor (except small businesses) meeting the dollar thresholds of $500,000 or $1,000,000 for the construction of a public facility as appropriate. The County (the prime contractor) cannot alter this requirement. Any subcontractor issuing subcontracts exceeding the thresholds must acquire a subcontracting plan and flowdown the provisions of their subcontracting plan to their lower-tier subcontractors. The following "standard" language shall be included in the plan with the understanding that the contract administrator will be responsible for assuring that the standard clauses are incorporated into appropriate subcontracts and that the subcontractors are obtaining further subcontracting plans as required:

Flowdown of Provisions

The County (contractor) agrees that the clause entitled "Utilization of Small Business Concerns and Small Disadvantaged Business Concerns" will be included in all subcontracts that offer further subcontracting opportunities, and all subcontractors except small business concerns who receive subcontracts in excess of $500,000 or $1,000,000 for construction of a public facility will be required to adopt and comply with a subcontracting plan similar to this one. Such plans will be reviewed by comparing them with the provisions of the clause, "Small Business and Small Disadvantaged Business Subcontracting Plan" (FAR 52.219-9), and assuring that all minimum requirements of an acceptable subcontracting plan have been satisfied. The acceptability of percentage and dollar goals shall be determined on a case-by-case basis depending on the supplies/services involved, the availability of potential small and small disadvantaged subcontractors, and prior experience. Once approved and implemented, plans will be monitored through the submission of periodic reports, and/or, as time and availability of funds permit, periodic visits to subcontractors' facilities to review applicable records and subcontracting program progress.

V. REPORTS AND SURVEYS

The County (contractor) will submit Standard Form 294 on a semi-annual basis and Standard Form 295 on an annual basis and agrees to submit such periodic reports and cooperate in any studies or surveys as may be required by the contracting agency (DOE) or the Small Business Administration in order to determine the extent of compliance by the bidder with the subcontracting plan and with the clause entitled "Utilization of Small Business Concerns and Small Disadvantaged Business Concerns" contained in the contract.

VI. RECORDS AND PROCEDURES

The County (contractor) agrees to maintain at least the following types of records to document compliance with this subcontracting plan:

A. Small and small disadvantaged business concerns source lists, guides and other data identifying SB/SDB vendors;

B. Organizations contacted for small and disadvantaged business sources;

C. On a subcontract-by-subcontract basis, records on all subcontract solicitations over $100,000, indicating on each solicitation (1) whether small business concerns were solicited, and if not, why not; (2) whether small disadvantaged business concerns were solicited, and if not, why not; and (3) reasons for the failure of solicited small or small disadvantaged business concerns to receive the subcontract award;

D. Records to support other outreach efforts: contacts with minority and small business trade associates, etc., attendance at small and minority business procurement conferences and trade fairs;

E. Records to support internal activities to guide and encourage buyers: workshops, seminars, training programs, etc., and monitoring activities to evaluate compliance; and

F. On a subcontract-by-subcontract basis records to support subcontract award data to include name and address of subcontractor.

SB/SDB Sub. Plan
County of Los Alamos
Final 11/12/92

SUBMITTED BY:

Signed: _____

Typed Name: James M. Flint

Title: County Administrator

Date: November 12, 1992

PLAN ACCEPTED BY:

_____
Contracting Officer

Date: _____

PLAN CONCURRED ON BY:

_____
Small and Disadvantaged Business Utilization Specialist

Date: _____

- END -

SPECIAL BANK ACCOUNT AGREEMENT

FOR USE WITH THE CHECKS - PAID METHOD

OF LETTER OF CREDIT FINANCING

ATTACHMENT G

SPECIAL BANK ACCOUNT AGREEMENT FOR USE WITH THE
CHECKS-PAID METHOD OF LETTER OF CREDIT FINANCING

This Agreement entered into this _____ day of _____, 19__, between the United States of America (hereinafter called the Government), represented herein by the Department of Energy (hereinafter called the DOE), and [Name of contractor] (hereinafter called the Contractor), a corporation under the laws of the State of [State] and [Name of Bank] (hereinafter called the Bank), a banking corporation under the laws of the State of [State], located at [City and State].

RECITALS

(a) On the date of _____ 19__, DOE and the Contractor entered into a Contract No. DE-AC04-89ALXXXXX providing for the making of advances of Government funds to the contractor. A copy of such advance provisions has been furnished to the Bank.

(b) DOE requires that amounts advanced to the Contractor under said Contract be deposited in a Special Bank Account or accounts with a bank designated by the Treasury Department as a depositary and financial agent of the Government (Section 10 of the Act of June 11, 1942, 56 Stat. 356; 12 U.S.C. 265), separate from any of the Contractor's general or other funds; and, the Bank being such a bank, the parties are agreeable to so depositing said amounts with the Bank.

(c) This Special Bank Account(s) shall be designated "[Name of contractor], Contract DE-AC04-89ALXXXXX, Department of Energy Special Bank Account."

COVENANTS

In consideration of the foregoing, and for other good and valuable consideration, it is agreed that:

(1) The Government shall have title to the credit balance in said Account(s) to secure the return of all advances made to the Contractor, which title shall be superior to any lien or claim of the Bank or others with respect to such Account(s).

(2) The Bank will be bound by the provisions of said contract between DOE and the Contractor relating to the deposit and withdrawal of funds in the above Special Bank Account(s), but shall not be responsible for the application of funds properly withdrawn from said Account(s). After receipt by the Bank of written directions from DOE, the Bank shall act thereon and shall be under no liability to any party hereto for any action taken in accordance with the said written directions.

(3) The Government, or its authorized representatives, shall have access to the books and records maintained by the Bank with respect to such Special Bank Account(s) at all reasonable times and for all reasonable purposes, including, without limitation, the inspection or copying of such books and records and any or all memoranda, checks, correspondence, or documents pertaining thereto. Except as agreed upon by the Government and the Bank, all books and records pertaining to the Special Bank Account(s) in the possession of the Bank relating to the Special Bank Account agreement shall be preserved by the Bank for a period of three (3) years after the final payment under the contract to which the Special Bank Account agreement pertains or otherwise disposed of in such manners as may agreed upon by the Government and the Bank.

(4) In the event of the services of any writ of attachment, levy of execution, or commencement of garnishment proceedings with respect to the Special Bank Account(s), the Bank will promptly notify DOE's Area Manager at [Address of Area Office].

(5) DOE will issue a Letter of Credit (irrevocable to the extent obligations have been incurred in good faith thereunder by the Contractor) to the Bank for the benefit of the Special Bank Account(s). The Bank agrees to honor upon presentation for payment all checks issued by the Contractor and to restrict its Letter of Credit withdrawals to an amount sufficient to maintain the account balance as close to zero as administratively possible each day.

The Bank will comply with the provisions contained in the Treasury Department Fiscal Requirements Manual (I TFRM 6-2000) which states that ordinarily, payment vouchers (FS-5401) should not be drawn more frequently than daily or for amounts less than $5,000, and in no case more than $5,000,000 unless so stated in the Letter of Credit. A copy of said Manual is in the Bank's possession.

The Bank agrees to service the Special Bank Account(s) in consideration of payment by the Contractor for its actual account activity at the "Per Item Cost" shown on the form entitled "Schedule of Bank Processing Charges" incorporated into this Agreement as Attachment A. The Bank agrees that the "Per Item Cost" will remain constant during the term of this Agreement.

(6) It is anticipated that the bank balance will be zero (-0-). However, if a balance occurs, the Treasury Tax and Loan rate (TT&L) will be used to compute the amount due as follows:

(a) Assuming a positive balance:

Positive Average Daily Collected Balance times TT&L will be the amount due and payable to the Contractor/DOE.

(b) Assuming a negative balance:

Negative Average Daily Balance times TT&L will be the amount due and payable to the Bank.

(7) This Agreement shall be effective from _____, 19__ through _____, 19__, unless earlier terminated as provided in this Agreement.

(8) The Government, the Contractor, or the Bank may terminate this Agreement at any time upon submitting written notification to the other parties 90 days prior to the desired termination date.

(9) The Government and the Contractor may terminate this Agreement at any time upon 30 days' notice to the Bank if the Government and/or the Contractor find that the Bank has failed to substantially perform its obligations under this Agreement.

(10) Notwithstanding the provisions of paragraphs (8) and (9), in the event the contract (referenced in Recital (a)) between the DOE and the Contractor is not renewed or is terminated, this Agreement between the Government, the Contractor and the Bank will automatically be terminated upon the delivery of written notice to the Bank.

(11) In the event of termination, the Bank agrees to retain the Contractor's Special Bank Account(s) for a 90-day period to allow for clearance of outstanding checks. During this 90-day period, DOE will place on deposit in the Account(s) sufficient funds to cover all outstanding checks presented for payment. During this 90-day period, it is further understood that all bank service charges will be consistent with the amounts reflected in Attachment A to this Agreement.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed as of the day and year first above written.

THE UNITED STATES OF AMERICA
BY: U.S. DEPARTMENT OF ENERGY

DATE: _____ BY: _____

[Name of Contractor]

DATE: _____ BY: _____

TITLE: _____

[Name of Bank]

DATE: _____ BY: _____

TITLE: _____

CONTRACTOR CORPORATE CERTIFICATE

I, _____, certify that I am the _____ of the [Name of contractor] named herein, that _____, who signed this Agreement on behalf of said corporation, was then _____ of said corporation; that this Agreement was duly signed for and in behalf of said corporation by authority of its governing body and is within the scope of its corporate povers; and that I have set my hand and the seal of the said corporation hereto on this _____ day of _____, 19__.

_____

TITLE: _____

(SEAL)

BANK CORPORATE CERTIFICATE

[Name of Bank]

I, _____, certify that I am the _____ of the _____ Bank named herein, that _____, who signed this Agreement on behalf of said corporation, was then _____ of said Bank; that this Agreement was duly signed for and in behalf of said Bank by authority of its governing body and is within the scope of its corporate povers; and that I have set my hand and the seal of the said Bank hereto on this _____ day of _____, 19__.

_____

TITLE: _____

(SEAL)

ATTACHMENT A TO SPECIAL BANK ACCOUNT AGREEMENT

SCHEDULE OF BANK PROCESSING CHARGES

	Per Item Cost
1. Checks Debited	@_____
2. Stop Payment Orders	@_____
3. Account Maintenance (Monthly)	@_____
4. Deposits:	@_____
a. Deposit Tickets	@_____
b. Local Items	@_____
c. Out-of-Town Items	@_____
5. Reconciliation Services:	
a. Tapes Supplied	@_____
b. Check Sorting	@_____
Reconciliation and statement required monthly. Checks supporting each statement to be sorted in numerical sequence by serial number that is magnetically encoded on each check. Monthly bank analyses showing number and amount of transactions with daily ending balances.	
6. Currency Shipments of $_____ weekly to be transported by [contractor].	@_____

BILLING INSTRUCTIONS

ATTACHMENT H

BILLING INSTRUCTIONS
U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE

I. These instructions are provided for the use by the Contractor in its preparation and submission of vouchers or invoices requesting reimbursement for costs incurred on negotiated cost-type contracts. Reimbursement procedures related to negotiated cost-type contracts involve the preparation and submission by the Contractor of adequately prepared vouchers to the Government. The submission of vouchers as prescribed herein will reduce correspondence and other causes for delay to a minimum and will thus assure prompt payments to the contractor.

II. In requesting reimbursement, contractors shall use the Government voucher SF-1034, Public Voucher for Purchases and Services Other Than Personal, or an acceptable substitute which provides the same necessary information as found in Attachment Nos. 1 and 2 to these instructions.

III. Each SF-1034 voucher will be prepared in an original and three copies. The voucher will be completed in accordance with the following numerical designations: (See Attachment No. 1.)

(1) All spaces numbered (1) should be left blank.

(2) Date voucher prepared and voucher number. It is suggested that vouchers be sequentially numbered for each contract.

(3) Contractor's name and mailing address and phone number.

(4) Contract number and date of contract.

(5) Where work assignments or task orders are involved in the billing, the number and date of the applicable order will be shown in this space, otherwise leave blank.

(6) Identify the period billing covers (i.e., month of January or January-March, 19__).

(7) Contract number cited must be the same as the number in the contract document and in item 4 above.

(8) Show the dollar amount of this billing. The amount claimed must agree with amount reflected in the detailed summary statement. The amount should be rounded to the nearest whole dollar.

(9) Place an X in the appropriate block for the type of payment for which reimbursement is requested.

IV. Submit an original SF-1034 and three copies with one copy of support documents for travel, nonexpendable equipment and direct labor by category (see Attachment No. 3 for sample format). If, however, the contract specifies a "Principal Ivestigator" or "Project Manager" by name(s), their time will be reported by the individual name(s). The Certification on Attachment No. 2 must be signed by an authorized official.

V. Payment of fixed fee. The fixed fee, if any, shall be paid in installments based on the percentage of completion of work, as determined by the Contracting Officer. Fixed fee will not be paid in less than monthly increments. Each voucher containing fixed fee will include a supporting document justifying the fixed fee amount in terms of the percentage of work completed. For level of effort contracts, the hours expended during the period shall be reported.

VI. At the option of the contractor, payments in excess of $25,000 can be made using the Treasury Financial Communications System (TFCS). Otherwise, payments will be made by a check mailed to the contractor. The TFCS provides on-line access to the Federal Reserve Communications System (FRCS), enabling your payment to be made to financial institutions that have access to the FRCS. Your payment can also be made to financial institutions that do not have access to the FRCS through correspondent financial institutions or Federal Reserve Banks. If the contractor opts to use the TFCS method of payment, the Payment Information Data Form (Attachment No. 4) should be completed and returned to the DOE to ensure that the DOE has correct TFCS information for making payments to the contractor's financial institution.

VII. The original voucher and all copies will be mailed to the following address:

U. S. Department of Energy
Albuquerque Operations Office
ATTN: Office Operations Section/FMD
P. O. Box 5400
Albuquerque, NM 87115

An additional copy of each voucher shall be sent to:
Contracting Officer

U. S. Department of Energy
Los Alamos Area Office
528 35th Street
Los Alamos, NM 87544

4 Attachments
1. Standard Form 1034
2. Detailed Backup for SF 1034
3. Instructions for Support Documents
4. TFCS Payment Information Data Form

Standard Form 1034
Revised January 1980
Department of the Treasury
I TFRM 4-2000
1034-116

PUBLIC VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL

VOUCHER NO (2)

U.S. DEPARTMENT, BUREAU, OR ESTABLISHMENT AND LOCATION
U. S. Department of Energy
Albuquerque Operations Office
Attn: Office Operations Section/FMD
P. O. Box 5400
Albuquerque NM 87115

DATE VOUCHER PREPARED (2)

CONTRACT NUMBER AND DATE (4)

REQUISITION NUMBER AND DATE (1)

SCHEDULE NO.

PAID BY (1)

PAYEE'S NAME AND ADDRESS (3)

DATE INVOICE RECEIVED (1)

DISCOUNT TERMS (1)

PAYEE'S ACCOUNT NUMBER (1)

SHIPPED FROM (1) TO (1) WEIGHT (1)

GOVERNMENT B/L NUMBER (1)

NUMBER AND DATE OF ORDER	DATE OF DELIVERY OR SERVICE	ARTICLES OR SERVICES (Enter description, item number of contract or Federal supply schedule, and other information deemed necessary)	QUANTITY	UNIT PRICE COST	UNIT PRICE PER	AMOUNT
(5)	(6)	(7) FOR REIMBURSEMENT OF COSTS INCURRED UNDER CONTRACT NO. AS DETAILED IN ATTACHED SUMMARY.	(1)	(1)	(1)	(8)

(Use continuation sheet(s) if necessary) (Payee must NOT use the space below) TOTAL (8)

PAYMENT:
- ☐ PROVISIONAL
- ☐ COMPLETE
- ☐ PARTIAL
- ☐ FINAL (9)
- ☐ PROGRESS
- ☐ ADVANCE

APPROVED FOR =$ (1)

EXCHANGE RATE (1) =$1.00

DIFFERENCES (1)

BY [2] (1)

TITLE (1)

Amount verified, correct for

(Signature or initials) (1)

Pursuant to authority vested in me, I certify that this voucher is correct and proper for payment.

(1) (Date) (1) (Authorized Certifying Officer)[2] (1) (Title)

ACCOUNTING CLASSIFICATION

(1)

PAID BY

CHECK NUMBER (1) ON ACCOUNT OF U.S. TREASURY (1)

CHECK NUMBER (1) ON (Name of bank) (1)

CASH $ (1) DATE (1)

PAYEE [3] (1)

[1] When stated in foreign currency, insert name of currency
[2] If the ability to certify and authority to approve are combined in one person, one signature only is necessary; otherwise the approving officer will sign in the space provided, over his official title
[3] When a voucher is receipted in the name of a company or corporation, the name of the person writing the company or corporate name, as well as the capacity in which he signs, must appear. For example "John Doe Company, per John Smith, Secretary", or "Treasurer", as the case may be

PER (1)

TITLE

Previous edition usable

☆ U.S. GOVERNMENT PRINTING OFFICE : 1983 O - 381-526 (9132)

NSN 7540-00-634-4206

PRIVACY ACT STATEMENT

The ABC Company
Anywhere, U. S. A. 01234

Contract No. DE-AC04-88ALXXXXX

Obligations: $XXX,XXX

Voucher No.
Date

Period of Performance:

Cost Categories (as applicable)	Previous Payments	Current Voucher No.	Cumulative Payments
Direct Labor			
Fringe Benefits @ %			
Overhead @ %			
Nonexpendable Items			
Materials & Supplies			
Travel			
Subcontract #1 (Jones)			
Subcontract #2 (Smith)			
Other Direct Costs			
Adjustments (Explain)			
G&A @ %			
Subtotal			
Fee @ %			
Fee Withheld			
Contractor's Portion (if applicable)			
Government's Share (if applicable)			

Current Contract Value:

Cost	$XXX,XXX
Fee	X,XXX
Total	$XXX,XXX

NOTE: A separate break-out shall be provided for each task if contract is a task order type.

CERTIFICATION: I certify that this invoice is correct and in accordance with the terms of the contract and that the costs included herein have been incurred, represent the payments made by the Contractor except as otherwise authorized in the payments provisions of the contract, and properly reflect the work performed.

_____ (Signature)

_____ (Title)

(NOTE: Attach one copy of support documents as instructed in Attachment No. 3.)

INSTRUCTIONS FOR SUPPORT DOCUMENTS

The purpose of the Support Documents is to allow the DOE technical representative to relate the progress achieved by the contractor to the cost incurred and ehnance his ability to manage the program and to enable the Contracting Officer to approve payment in a timely manner. The Support Documents should be presented in enough detail to meet these objectives.

Travel

(1) a copy of the detailed travel expense report without copies of receipts, tickets, etc.; or

(2) a listing reflecting the name of the individual, destination, date of departure and return, purpose of trip, and total travel costs incurred.

Nonexpendable Equipment

(1) listing of nonexpendable equipment purchased to reflect name of vendor, description of item purchased, date purchased, cost and DOE property tag number; or

(2) a copy of the invoice received from the vendor with the DOE property tag number reflected.

Direct Labor

(1) listing by name and hours charged to this contract during the billed period; or

(2) listing by labor category, i.e., Senior Research Scientist, Chemical Engineer, Technician, Draftsman and hours charged to this contract during the billed period.

Subcontracts

(1) for fixed priced subcontracts, provide a copy of the paid voucher.

(2) for cost reimbursement subcontracts, provide detail consistent with the prime contract requirements.

Payment Information Data Form
Treasury Financial Communications System

Payments under Department of Energy (DOE) contracts may be made by use of electronic funds transfers. The information requested herein concerning your financial institution will be used for that purpose. The information should be available through your company's Treasurer or financial institution.

If your financial institution has access to the Federal Reserve Communications System, please do not complete items 10-13. If your financial institution does not have access to the Federal Reserve Communications System, please complete all items, except item 7.

1. Name of Contractor Company:

2. Contractor Address:

3. Contractor Contact Person:

4. Contractor Contact Person Telephone Number: Area Code ( )

5. Name of Financial Institution:

6. Address of Financial Institution:

7. Financial Institution's nine-digit American Bankers Association (ABA) Identifying Number for Routing Transfer of Funds: _____.
(Complete only if your Financial Institution has access to the Federal Reserve Communications System.)

8. Telegraphic Abbreviation of Financial Institution:

9. Account Number at your Financial Institution to be credited with the funds:

10. Name of Correspondent Financial Institution your Financial Institution receives electronic funds transfer messages through, if it does not have access to the Federal Reserve Communications System:

11. Address of Correspondent Financial Institution:

12. Correspondent Financial Institution's nine-digit ABA Identifying Number for Routing Transfer of Funds: _____.

13. Telegraphic Abbreviation of Correspondent Financial Institution:

14. Signature and Title of Authorizing Company Official:

_____	_____	_____
Signature	Title	Date

Comments:

WAGE DETERMINATION

U. S. DEPARTMENT OF LABOR

86-0105 (Revision No. 16)
86-0108 (Revision No. 12)
86-0116 (Revision No. 13)

ATTACHMENT I

U.S. DEPARTMENT OF LABOR
MPLOYMENT STANDARDS ADMINISTRATION
WAGE AND HOUR DIVISION
WASHINGTON, D.C. 20210

EGISTER OF WAGE DETERMINATIONS UNDER
THE SERVICE CONTRACT ACT
y direction of the Secretary of Labor

Alan L. Moss

lan L. Moss
irector

Division of
Wage Determinations

LOCALITY	State: New Mexico Area: NM COUNTIES: BERNALILLO, CATRON CIBOLA, COLFAX, DE BACA, GUADALUPE, HARDING LOS ALAMOS, MCKINLEY, MORA, RIO ARRIBA SAN JUAN, SAN MIGUEL, SANDOVAL, SANTA FE SOCORRO, TAOS, TORRANCE, VALENCIA

Wage Determination No.: 86-0105 (Rev. 16) Date: 09/18/1991

Class of Service Employees	Minimum Hourly Wage	Fringe Benefit Payments			
		Health & Welfare	Vacation	Holiday	Other

tomatic Data Processing Occupations, Information and
ts Occupations, Library and Archive Occupations, and
echnical Occupations:

1.	Computer Data Librarian	$ 8.82
2.	Computer Operator I	$ 7.69
3.	Computer Operator II	$ 9.86
4.	Computer Operator III	$ 12.61
5.	Computer Operator IV 1/	$ 13.41
6.	Computer Programmer I 1/	$ 10.10
7.	Computer Programmer II 1/	$ 12.12
8.	Computer Programmer III 1/	$ 15.18
9.	Computer Programmer IV 1/	$ 18.36
10.	Computer Systems Analyst I 1/	$ 13.26
11.	Computer Systems Analyst II 1/	$ 15.34
12.	Computer Systems Analyst III 1/	$ 18.09
13.	Computer Systems Analyst IV 1/	$ 21.69
14.	Key Entry Operator I	$ 6.08
15.	Key Entry Operator II	$ 8.03
16.	Peripheral Equipment Operator	$ 9.27
17.	Exhibits Specialist I	$ 9.01
18.	Exhibits Specialist II	$ 11.00
19.	Exhibits Specialist III	$ 13.76
20.	Illustrator I	$ 9.01

U.S. DEPARTMENT OF LABOR
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an L. Moss
rector

Division of
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LOCALITY

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CIBOLA, COLFAX, DE BACA, GUADALUPE, HARDING
LOS ALAMOS, MCKINLEY, MORA, RIO ARRIBA
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SOCORRO, TAOS, TORRANCE, VALENCIA

Wage Determination No.: 86-0105 (Rev. 16) Date: 09/18/1991

Class of Service Employees	Minimum Hourly Wage	Fringe Benefit Payments			
		Health & Welfare	Vacation	Holiday	Other
Illustrator II	$ 11.00				
Illustrator III	$ 13.76				
Photographer I	$ 9.01				
Photographer II	$ 11.00				
Photographer III	$ 13.76				
Librarian	$ 12.78				
Library Technician	$ 8.34				
Technical Information Specialist I	$ 9.01				
Technical Information Specialist II	$ 11.00				
Technical Information Specialist III	$ 13.76				
Laboratory Tester	$ 9.99				
Technical Writer	$ 10.58				
Drafter I	$ 6.16				
Drafter II	$ 8.10				
Drafter III	$ 9.01				
Drafter IV	$ 11.00				
Drafter V	$ 13.70				
Technician I 5/	$ 9.91				
Technician II 5/	$ 11.63				
Technician III 5/	$ 13.36				
Instructor	$ 11.18				

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Wage Determination No.: 86-0105 (Rev. 16) Date: 09/18/1991

Class of Service Employees	Minimum Hourly Wage	Fringe Benefit Payments			
		Health & Welfare	Vacation	Holiday	Other

Fringe benefits applicable to all classes of service employees engaged in contract performance: 2/ 3/ 4/

1/ Does not apply to employees employed in a bona fide executive, administrative, or professional apacity as defined and delineated in 29 CFR 541. (See 29 CFR 4.156)

2/ HEALTH & WELFARE: $.74 an hour or $29.60 a week or $128.26 a month.

3/ VACATION: 2 weeks paid vacation after 1 year of service with a contractor or successor; 3 weeks after 10 years; 4 weeks after 15 years. Length of service includes the whole span of continuous service with the present (successor) contractor, wherever employed, and with predecessor contractors in the performance of similar work at the same Federal facility. (Reg. 4.173)

4/ HOLIDAYS: 10 paid holidays per year: New Year's Day, Martin Luther King Jr.'s Birthday, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day, and Christmas Day. (A contractor may substitute for any of the named holidays another day off with pay in accordance with a plan communicated to the employees involved.)

5/ The Technician classification includes all of the following: Electronics, Electromechanical, Environmental, Instrumentation, Mathematical, Mechanical, and Photo-Optics

The contracting officer shall require that any class of service employee which is not listed n and which is to be employed under the contract (i.e., the work to be performed is not rmed by any classification listed in the wage determination), be classified by the contractor to provide a reasonable relationship (i.e., appropriate level of skill comparison) between unlisted classifications and the classifications listed in the wage determination. Such rmed classes of employees shall be paid the monetary wages and furnished the fringe benefits e determined. Such conforming procedures shall be initiated by the contractor prior to the rmance of contract work by such unlisted class(es) of employees. A written report of the sed conforming action, including information regarding the agreement or disagreement of the rized representative of the employees involved or, where there is no authorized esentative, the employees themselves, shall be submitted by the contractor to the contracting cer no later than 30 days after such unlisted class(es) of employees performs any contract The contracting officer shall review the proposed action and promptly submit a report of the on, together with the agencys' recommendation and all pertinent information including the cion of the contractor and the employees, to the Wage and Hour Division, Employment Standards nistration, U.S. Department of Labor, for review. (See section 4.6 (b)(2) of Regulations 29 4)

ORM ALLOWANCE: If employees are required to wear uniforms in the performance of this contract her by the terms of the Government contract, by the employer, by the state or local law, etc.), cost of furnishing such uniforms and maintaining (by laundering or dry cleaning) such uniforms n expense that may not be borne by an employee where such cost reduces the hourly rate below required by the wage determination. The Department of Labor will accept payment in accordance the following standards as compliance:

contractor or subcontactor is required to furnish all employees with an adequate number of forms without cost or to reimburse employees for the actual cost of the uniforms. In addition, e uniform cleaning and maintenance is made the responsibility of the employee, contractors and subcontractors subject to this wage determination shall (in the absence of a fide collective bargaining agreement providing for a different amount, or the furnishing of trary affirmative proof as to the actual cost), reimburse all employees for such cleaning and ntenance at a rate of $3.80 a week (or 76 cents a day); and effective April 1, 1991, the note ll be $4.25 per week (or $.85 cents per day). However, in those instances where the uniforms nished are made of "wash and wear" materials, may be routinely washed and dried with other sonal garments, and do not require any special treatment such as dry cleaning, daily washing, or mercial laundering in order to meet the cleanliness or appearance standards set by the terms of Government contract, by the contractor, by law, or by the nature of the work, there is no uirement that employees be reimbursed for uniform maintenance costs.

E: The duties of employees under job titles listed are those described in the Service Contract Directory of Occupations, Second Edition, July 1986, unless otherwise indicated. See also 29 Part 4 Section 4.152.

U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION
WAGE AND HOUR DIVISION
WASHINGTON, D.C. 20210

REGISTER OF WAGE DETERMINATIONS UNDER
THE SERVICE CONTRACT ACT
By direction of the Secretary of Labor

Alan L. Moss
Director

Division of
Wage Determinations

LOCALITY	State: New Mexico Area: NM COUNTIES: BERNALILLO, CATRON CIBOLA, COLFAX, DE BACA, GUADALUPE, HARDING LOS ALAMOS, MCKINLEY, MORA, RIO ARRIBA SAN JUAN, SAN MIGUEL, SANDOVAL, SANTA FE SOCORRO, TAOS, TORRANCE, VALENCIA

Wage Determination No.: 86-0108 (Rev. 12) Date: 09/18/1991

Class of Service Employees	Minimum Hourly Wage	Fringe Benefit Payments			
		Health & Welfare	Vacation	Holiday	Other
Administrative Support and Clerical Occupations:					
1. Accounting Clerk I	$ 6.35				
2. Accounting Clerk II	$ 7.37				
3. Accounting Clerk III	$ 8.86				
4. Accounting Clerk IV	$ 9.92				
5. Dispatcher, Motor Vehicle	$ 6.94				
6. Driver Messenger	$ 8.52				
7. File Clerk I	$ 5.49				
8. File Clerk II	$ 6.25				
9. File Clerk III	$ 7.50				
10. Audiovisual Services Clerk (Film/Tape Librarian)	$ 7.37				
11. Inventory Clerk	$ 6.94				
12. Mail Clerk	$ 5.49				
13. Messenger	$ 5.86				
14. Order Clerk I	$ 6.96				
15. Order Clerk II	$ 9.55				
16. Payroll Clerk	$ 8.48				
17. Production Control Clerk	$ 9.92				
18. Receptionist	$ 6.64				
19. Scheduler, Maintenance	$ 8.20				
20. Secretary I	$ 8.20				
21. Secretary II	$ 8.48				

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SOCORRO, TAOS, TORRANCE, VALENCIA

Wage Determination No.: 86-0108 (Rev. 12) Date: 09/18/1991

Class of Service Employees	Minimum Hourly Wage	Fringe Benefit Payments			
		Health & Welfare	Vacation	Holiday	Other
22. Secretary III	$ 10.72				
23. Secretary IV	$ 12.39				
24. Secretary V	$ 12.94				
25. Service Order Dispatcher	$ 6.94				
26. Stenographer I	$ 8.02				
27. Stenographer II	$ 9.24				
28. Supply Clerk/Storeworker/ Shelf Stocker/Store Clerk	$ 6.94				
29. Supply Technician	$ 10.72				
30. Switchboard Operator	$ 6.64				
31. Switchboard Operator-Receptionist	$ 6.64				
32. Transcribing-Machine Typist	$ 8.20				
33. Typist I	$ 6.68				
34. Typist II	$ 7.59				
35. Word Processor I	$ 6.71				
36. Word Processor II	$ 8.36				
37. Reservation Agent-in-charge	$ 12.94				
38. Lead Reservation Clerk	$ 12.39				
39. Reservation Clerk	$ 10.72				

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Wage Determination No.: 86-0108 (Rev. 12) Date: 09/18/1991

Class of Service Employees	Minimum Hourly Wage	Fringe Benefit Payments			
		Health & Welfare	Vacation	Holiday	Other

ringe benefits applicable to all classes of service employees
ngaged in contract performance: 1/ 2/ 3/

/ HEALTH & WELFARE: Life, accident, and health insurance plans, sick leave, pension plans, civic d personal leave, severance pay, and savings and thrift plans: Employer contributions costing an erage of $2.07 per hour computed on the basis of all hours worked by service employees employed the contract.

/ VACATION: 2 weeks paid vacation after 1 year of service with a contractor or successor; 3 weeks ter 10 years; 4 weeks after 15 years. Length of service includes the whole span of continuous rvice with the present (successor) contractor, wherever employed, and with predecessor ntractors in the performance of similar work at the same Federal facility. (Reg. 4.173)

/ HOLIDAYS: 10 paid holidays per year: New Year's Day, Martin Luther King Jr.'s Birthday, shington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans' Day, anksgiving Day, and Christmas Day. (A contractor may substitute for any of the named holidays other day off with pay in accordance with a plan communicated to the employees involved.)

NOTE: The contracting officer shall require that any class of service employee which is not listed herein and which is to be employed under the contract (i.e., the work to be performed is not performed by any classification listed in the wage determination), be classified by the contractor so as to provide a reasonable relationship (i.e., appropriate level of skill comparison) between such unlisted classifications and the classifications listed in the wage determination. Such conformed classes of employees shall be paid the monetary wages and furnished the fringe benefits as are determined. Such conforming procedures shall be initiated by the contractor prior to the performance of contract work by such unlisted class(es) of employees. A written report of the proposed conforming action, including information regarding the agreement or disagreement of the authorized representative of the employees involved or, where there is no authorized representative, the employees themselves, shall be submitted by the contractor to the contracting officer no later than 30 days after such unlisted class(es) of employees performs any contract work. The contracting officer shall review the proposed action and promptly submit a report of the action, together with the agencys' recommendation and all pertinent information including the position of the contractor and the employees, to the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, for review. (See section 4.6 (b)(2) of Regulations 29 CFR 4)

UNIFORM ALLOWANCE: If employees are required to wear uniforms in the performance of this contract (either by the terms of the Government contract, by the employer, by the state or local law, etc.), the cost of furnishing such uniforms and maintaining (by laundering or dry cleaning) such uniforms is an expense that may not be borne by an employee where such cost reduces the hourly rate below that required by the wage determination. The Department of Labor will accept payment in accordance with the following standards as compliance:

The contractor or subcontactor is required to furnish all employees with an adequate number of uniforms without cost or to reimburse employees for the actual cost of the uniforms. In addition, where uniform cleaning and maintenance is made the responsibility of the employee, all contractors and subcontractors subject to this wage determination shall (in the absence of a bona fide collective bargaining agreement providing for a different amount, or the furnishing of contrary affirmative proof as to the actual cost), reimburse all employees for such cleaning and maintenance at a rate of $3.80 a week (or 76 cents a day); and effective April 1, 1991, the note shall be $4.25 per week (or $.85 cents per day). However, in those instances where the uniforms furnished are made of "wash and wear" materials, may be routinely washed and dried with other personal garments, and do not require any special treatment such as dry cleaning, daily washing, or commercial laundering in order to meet the cleanliness or appearance standards set by the terms of the Government contract, by the contractor, by law, or by the nature of the work, there is no requirement that employees be reimbursed for uniform maintenance costs.

OTE: The duties of employees under job titles listed are those described in the Service Contract ct Directory of Occupations, Second Edition, July 1986, unless otherwise indicated. See also 29 FR Part 4 Section 4.152.

********** OCCUPATIONS NOT INCLUDED IN THE SCA DIRECTORY OF OCCUPATIONS **********

ESERVATION AGENT-IN-CHARGE

evelops itineraries for worldwide travel regardless of complexity and, using an airline eservation computer system, arranges reservation and ticketing service to meet business equirements and schedules. Determines authorized and cost effective modes, carriers and routings nd arranges rental car service. Is the working supervisor for a travel section consisting of two r more reservation clerks, or may be designated as a site supervisor at a small branch location.

EAD RESERVATION CLERK

evelops more difficult and unique itineraries for worldwide travel and using an airline eservation computer system, arranges reservation and ticketing service to meet business equirements and schedules. Determines authorized and cost effective modes, carriers and routings nd arranges rental car service. Acts as a "trouble shooter" for other reservation clerks and rovides guidance and assistance with unusual or difficult routings.

ESERVATION CLERK

evelops relatively routine and less complicated itineraries for worldwide travel and, using an irline reservation computer system, arranges business requirements and schedules. Determines uthorized and cost effective modes, carriers and routings and arranges rental car service.

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LOS ALAMOS, MORA, RIO ARRIBA, SAN JUAN
SAN MIGUEL, SANDOVAL, SANTA FE, SOCORRO, TAOS
TORRANCE, VALENCIA

Wage Determination No.: 86-0116 (Rev. 13) Date: 09/18/1991

Class of Service Employees	Minimum Hourly Wage	Fringe Benefit Payments			
		Health & Welfare	Vacation	Holiday	Other
rotective Services:					
1. Court Security Officer	$ 6.49				
2. Detention Officer/Correction Officer	$ 6.49				
3. Firefighter	$ 6.49				
4. Guard I	$ 5.17				
5. Guard II	$ 6.49				
6. Police Officer	$ 6.49				

Fringe benefits applicable to all classes of service employees
engaged in contract performance: 1/ 2/ 3/

1/ HEALTH & WELFARE: Life, accident, and health insurance plans, sick leave, pension plans, civic nd personal leave, severance pay, and savings and thrift plans: Employer contributions costing an verage of $2.07 per hour computed on the basis of all hours worked by service employees employed n the contract.

2/ VACATION: 2 weeks paid vacation after 1 year of service with a contractor or successor; 3 weeks fter 10 years; 4 weeks after 15 years. Length of service includes the whole span of continuous ervice with the present (successor) contractor, wherever employed, and with predecessor ontractors in the performance of similar work at the same Federal facility. (Reg. 4.173)

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Wage Determination No.: 86-0116 (Rev. 13) Date: 09/18/1991

Class of Service Employees	Minimum Hourly Wage	Fringe Benefit Payments			
		Health & Welfare	Vacation	Holiday	Other

HOLIDAYS: 10 paid holidays per year: New Year's Day, Martin Luther King Jr.'s Birthday, shington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans' Day, nksgiving Day, and Christmas Day. (A contractor may substitute for any of the named holidays other day off with pay in accordance with a plan communicated to the employees involved.)

OTE: The contracting officer shall require that any class of service employee which is not listed erein and which is to be employed under the contract (i.e., the work to be performed is not erformed by any classification listed in the wage determination), be classified by the contractor o as to provide a reasonable relationship (i.e., appropriate level of skill comparison) between uch unlisted classifications and the classifications listed in the wage determination. Such onformed classes of employees shall be paid the monetary wages and furnished the fringe benefits s are determined. Such conforming procedures shall be initiated by the contractor prior to the erformance of contract work by such unlisted class(es) of employees. A written report of the roposed conforming action, including information regarding the agreement or disagreement of the uthorized representative of the employees involved or, where there is no authorized epresentative, the employees themselves, shall be submitted by the contractor to the contracting fficer no later than 30 days after such unlisted class(es) of employees performs any contract ork. The contracting officer shall review the proposed action and promptly submit a report of the ction, together with the agencys' recommendation and all pertinent information including the osition of the contractor and the employees, to the Wage and Hour Division, Employment Standards dministration, U.S. Department of Labor, for review. (See section 4.6 (b)(2) of Regulations 29 FR 4)

IFORM ALLOWANCE: If employees are required to wear uniforms in the performance of this contract either by the terms of the Government contract, by the employer, by the state or local law, etc.), e cost of furnishing such uniforms and maintaining (by laundering or dry cleaning) such uniforms an expense that may not be borne by an employee where such cost reduces the hourly rate below at required by the wage determination. The Department of Labor will accept payment in accordance th the following standards as compliance:

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TE: The duties of employees under job titles listed are those described in the Service Contract
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R Part 4 Section 4.152.

CONTRACT NOTIFICATIONS

AND SUBMITTALS

*** CONTRACT NOTIFICATIONS AND SUBMITTALS ***

(FN-NOTSUB.WK1/LOTUS)

DESCRIPTION	REFERENCE	DUE SCHEDULE	NO. OF COPIES
Confidentiality of Information Agreement	Special Contract Requirements (SCR) H.03	Upon request	1 copy
Overtime Approval	SCR H.14	As required, each occurrence	1 copy
Overtime Use Report	SCR H.14	Each occurrence, weekly	1 copy
Cost Voucher, Indirect Costs	SCR H.16.(a) and Contract Clause (CC) 24	Monthly	1 copy
Cost Voucher, Direct Costs	SCR H.16.(d), CC 24	Monthly	1 copy
Fire Department Managment Team	SCR, H.18	30 days after award	1 copy
Certificate of Procurement Integrity	CC 7.(b)	Each modification	1 copy
Notification of Intent to Subcontract with Debarred Party	CC 14(c)	Each occurrence	1 copy
Organizational Conflict of Interests	CC 15(b) and SCR, H.21	Each occurrence	1 copy
Release of Information	SCR, H.22	Each occurrence	1 copy
Automatic Data Proc. Eq.	SCR, H.23	Each occurrence	1 copy
Acquisition of Real Property	CC 27	Each occurrence	1 copy
Subcontracting Plan	CC 29	As requested	1 copy
Notice of Labor Disputes	CC 34 and SOW IX.A	Each potential labor dispute	1 copy
Equal Opportunity Pre-award Clearance	CC 37	Each Subcontract over $1M	1 copy

*** CONTRACT NOTIFICATIONS AND SUBMITTALS ***

(FN-NOTSUB.WK1/LOTUS)

DESCRIPTION	REFERENCE	DUE SCHEDULE	NO. OF COPIES
Employment Report, Vietnam Era Veterans	CC 40	March 31 each year	1 copy Form VETS 100
Paperwork Reduction Act	CC 49(b)	Each occurrence	1 copy
Notice of Patent or Copyright Infringement	CC 53	Each occurrence	1 copy
Insurance-Liability to Third Parties	CC 54	Each occurrence	1 copy
Notice of Suit or Claim That Could be a Cost to Contract	CC 54(g)	Each occurrence	1 copy
Limitation of Funds	CC 59	When costs are expected to exceed 75% of allotted fund in next 60 days	1 copy
Disputes	CC 62	Each occurrence	1 copy
Key Personnel	CC 64	Each change of personnel	1 copy
Continuity of Operations Plan	CC 66	60 days after award of contract	5 copies draft, and final
Notice of Intent to Disallow Costs	CC 67(a)(2)	60 days or less after notice to not allow costs	1 copy
Changes-Cost-Reimbursement	CC 68(c)	30 days after receipt of order	1 copy
Subcontracts	CC 69	Each occurrence, as required	1 copy of all documents
Property Management Program Plan	CC 71 and SOW VI.A	180 days after award of contract	3 copies dr 1 copy final
Nuclear Hazards Claim	CC 77	Each occurrence	1 copy
Safety and Health	CC 82	30 days after	1 copy draft

*** CONTRACT NOTIFICATIONS AND SUBMITTALS ***

(FN-NOTSUB.WK1/LOTUS)

DESCRIPTION	REFERENCE	DUE SCHEDULE	NO. OF COPIES
Management Program		award of contract	1 copy final
Workplace Substance Abuse Program	CC 85	30 days after award of contract	3 copies draft 1 copy final
Personnel and Equipment Response Procedures	Statement of Work, (SOW) I.B.3	30 days after award of contract	3 copies draft 1 copy final
EMT-I Implementation Plan	SOW I.C.3	30 days after award of contract	3 copies draft 1 copy final
Rescue Services Operating Procedures	SOW, I.C.5	90 days after award of contract.	3 copies draft 1 copy final
Communications and Dispatch Plan	SOW I.D.4	Continuing	3 copies draft 1 copy final
Communications and Dispatch Procedures	SOW I.D.1	120 days after award of contract	3 copies draft 1 copy of final
Contractor's Organization Structure Chart	SOW II.B and C	At award and each change	3 copies draft and final
FTE Levels Overstaffing	SOW II.D	Each occurrence	1 copy
Fire Department Organization Chart/Narrative	SOW II.B	Prior to contract award and as requested by C.O.	3 copies draft and final
Annual Fire Department Budget	SOW III.A	Sept. 30th of each year and updates as requested	1 copy
Budget Overruns	SOW III.A.2	Each occurrence	1 copy
Cost Management System	SOW III.B.1	180 days after award of contract	3 copies draft and final
Monthly Cost Reports	SOW III.B.3	30 calendar days after end of month	1 copy
Personnel Management Plan	SOW IV.	60 days after award of contract	3 copies draft and final
Security Plan	SOW V.	30 days after	3 copies draft

*** CONTRACT NOTIFICATIONS AND SUBMITTALS ***

(FN-NOTSUB.WK1/LOTUS)

DESCRIPTION	REFERENCE	DUE SCHEDULE	NO. OF COPIES
		award of contract	and final
Appointment of Training Officer	SOW VII.A.2	At time of award	1 copy
Fire Department Training Program	SOW VII.A.3.j	60 days after award of contract	3 copies draft 1 copy final
Incident Command System Procedures	SOW VIII.A.3	60 days after award of contract	3 copies draft 1 copy final
Occurrence Reporting Procedures	SOW VIII.B.4	30 days after award of contract	3 copies draft 1 copy final
Occurrence Reports	SOW VIII.B	Each incident within two hours telephone, 24 hr., 10 day and final reports	Telephone a... ORPS electror... system.
Continuity of Operations Contingency Plan	SOW IX.B	90 days after award of contract	1 copy
Work Stoppage Notice	SOW IX.A	Each occurrence	3 copies draft and final
Pre-Fire Planning Program	SOW X.E	30 days after award of contract	3 copies
Pre-Fire Plans of Facilities	SOW X.D	At time of award and continuing	1 copy
Intent to Enter into Mutual-Aid Agreements	SOW XI.C	Each occurrence	3 copies draft and final
Mutual-Aid Agreements	SOW XI.D	Each occurrence	Copies of data to be provided as requested
Fire Hydrant Flow Testing	SOW XII.A	Reports to be delivered within 30 days of completions of the tests	3 copies draft and final
Procedures for Fire Hydrant Testing	SOW XII.A.3	45 days after award of contract	3 copies drai... and final. One copy on PC disk
Operational Procedures	SOW XIII	As completed	

APPENDIX L

Memorandum of Understanding Between the U.S. Department of Energy and the Incorporated County of Los Alamos for Mutual Aid Assistance

MEMORANDUM OF UNDERSTANDING

DE-GM32-92AL82509

THE U. S. DEPARTMENT OF ENERGY

AND

THE INCORPORATED COUNTY OF LOS ALAMOS

STATE OF NEW MEXICO

FOR

MUTUAL AID ASSISTANCE

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
UNITED STATES DEPARTMENT OF ENERGY
LOS ALAMOS AREA OFFICE

AND THE

INCORPORATED COUNTY OF LOS ALAMOS, NEW MEXICO

CONCERNING

MUTUAL AID AND EMERGENCY RESPONSE

INTRODUCTION:

THIS MEMORANDUM OF UNDERSTANDING (MOU) is between the United States of America (the Government), Department of Energy (DOE), Los Alamos Area Office (LAAO), and the Incorporated County of Los Alamos, State of New Mexico (County).

WHEREAS, both parties have certain responsibilities for protecting the public; and

WHEREAS, both parties have developed and maintain capabilities to accomplish their respective responsibilities; and

PURPOSE:

WHEREAS, both parties recognize that developing and maintaining a program of mutual assistance will enhance each party's ability to accomplish its responsibilities in a more effective and efficient manner; and

WHEREAS, both parties are willing to enter into this MOU;

AUTHORITY:

WHEREAS, the DOE is authorized to enter into this MOU by Public Law 95-91; and DOE Order 1280.1A, dated November 15, 1991; and

WHEREAS, The County is authorized to enter into this MOU by Article I, Sections 100 and 103 of the Charter for the Incorporated County of Los Alamos, Sections 2.50.020, 2.48.020, 2.16.010 and 2.16.020 of the Los Alamos County Code, the New Mexico Constitution, Art. X, Section 6 and the Community Right to Know Act of 1986 (SARA Title III), Sections 301-303 and Section 12-10-6 NMSA, 1978.

NOW, THEREFORE, it is understood and agreed by the parties that the MOU will be as follows:

MANAGEMENT AND PROGRAM GUIDELINES:

1. The DOE will provide assistance to the County, when requested, for the following:

   a. Bomb threats, bomb and explosive incidents;
   b. Hazardous material emergencies or incidents; and
   c. Natural disasters, or "Acts of God," affecting the County.

   The County will provide assistance for emergencies to DOE, when requested, for Los Alamos police assistance, highway maintenance equipment, and use of County buildings and facilities on an as-needed basis.

   DOE and County assistance will be rendered to each entity within the incorporated boundary of Los Alamos County and areas outside the County to the extent provided for through other MOUs between the DOE, the County and other jurisdictions.

2. Both the DOE and the County reserve the right to determine the extent of the assistance either will render to the other in response to requests for assistance.

3. Mutual Aid Response Procedures will be developed and updated annually, specifying the policies and procedures to be followed in implementing this MOU.

4. The DOE and the County covenant and agree that no claim for compensation will be made against each other for any loss, damage, personal injury, or death occurring in consequence of bomb threat, natural disaster or hazardous material response assistance rendered under this agreement, and all such rights or claims are hereby expressly waived.

5. Notwithstanding any other term, condition or provision of this MOU, nothing contained in this MOU shall in any way alter the County's rights, privileges, immunities or protection under the New Mexico Tort Claims Act, Section 41-4-1, NMSA, 1978.

6. A copy of this MOU will be provided by LAAO to the Los Alamos Police and Fire Departments, the University of California Regents, the DOE Albuquerque Field Office, the Los Alamos Medical Center, the Los Alamos Schools, and the State of New Mexico, after it has been signed by both parties.

7. This MOU shall not be used to obligate or commit funds or as the basis for the transfer of funds.

8. Subject to the Freedom of Information Act (5 U.S.C. 5520), decisions on disclosure of information to the public regarding this MOU shall be made by DOE following consultation with the County-designated representative.

9. This MOU shall become effective upon the latter date of signature of the parties. It shall remain in effect for a 5-year term from the effective date. It may be terminated by the mutual written agreement of DOE and the County or by either party upon 30-day written notice to the other party.

Accepted on Behalf of the DOE by the:

Area Manager, Los Alamos Area Office Date 1-14-93

Accepted on Behalf of the County by the:

Los Alamos County Administrator Date 1-12-93

Approved as to form:

County Attorney
Assistant Date 1-13-93

APPENDIX M

Planning Agreement Between the U.S. Department of Energy Los Alamos Area Office and the Los Alamos Medical Center

Agreement No.DE-GM32-86AL37090

PLANNING AGREEMENT
BETWEEN THE LOS ALAMOS AREA OFFICE
U.S. DEPARTMENT OF ENERGY
AND
THE LOS ALAMOS MEDICAL CENTER

This PLANNING AGREEMENT, effective when signed by both parties hereto, is entered into by and between the LOS ALAMOS AREA OFFICE (hereinafter "LAAO") of the UNITED STATES DEPARTMENT OF ENERGY (hereinafter "DOE") and the LOS ALAMOS MEDICAL CENTER (hereinafter "the Hospital"), a nonprofit corporation incorporated in the State of North Dakota.

WITNESSETH THAT:

WHEREAS, LAAO is responsible for establishing and implementing an Emergency Planning, Preparedness, and Response Program for the Los Alamos National Laboratory, which is operated for DOE by the Regents of the University of California (hereinafter "the University"); and

WHEREAS, DOE and the Hospital recognize the need to prepare for radiological emergencies which may affect the employees of DOE, the University, and its subcontractors (hereinafter "Laboratory workers") many of whom are residents of the communities served by the Hospital and that in the event of a

serious radiological or other emergency, DOE may require off-site hospital and medical services to treat injured Laboratory workers; and

WHEREAS, the Hospital is willing to provide hospital and medical services, upon request by DOE, in the event of a radiological or other emergency; and

WHEREAS, the purpose of this Planning Agreement is to establish the framework for cooperation between DOE and the Hospital leading to the provision by the Hospital of hospital and medical facilities in the event of a radiological or other emergency at the Los Alamos National Laboratory; and

WHEREAS, this Planning Agreement is authorized by Public Law 95-91, and other applicable law.

NOW, THEREFORE, the parties hereto agree as follows:

Article I. Statement of Responsibilities

(a) The Hospital agrees to use its best efforts to provide, upon request by DOE, reasonable facilities and such staff physicians, technologists, nurses and related personnel as required for the proper care and treatment of Laboratory workers who are injured in a radiological accident and who may be contaminated with radioactive material. The Hospital also agrees to provide for the care of the dead who may be

contaminated with radioactive material. It is understood that all such facilities and personnel shall be provided subject first to the requirements imposed upon the Hospital by the General Laws of the State of New Mexico for the provision of medical care to the citizenry of the state.

(b) DOE agrees to provide information and training for physicians, technologists, nurses, and related personnel regarding the care and treatment of patients contaminated with radioactive materials. If the Hospital does provide hospital and medical services to DOE as described in this Planning Agreement, DOE shall be responsible for removing from the Hospital for disposal all contaminated and potentially contaminated material.

(c) DOE and the Hospital agree to participate on any working committees that the LAAO Area Manager and the Hospital Administrator determine are necessary for the implementation of this Planning Agreement.

(d) The Hospital is already making available and will continue to make available a space identified as Room 137, the Decontamination Room, pursuant to a separate rental agreement with the University.

Article II. Funding

The details for payment of the services which may be provided by the Hospital will be developed through a specific contract

between DOE and the Hospital and are not covered by this Planning Agreement. DOE and the Hospital agree to cooperate to provide the necessary information to prepare such a contract.

Article III. Management Arrangements

This Planning Agreement envisages direct contact among the LAAO Area Manager; the Hospital Administrator and his designated staff; and the Group Leader, HSE-2, Occupational Medicine Group of the Los Alamos National Laboratory and his designated staff in carrying out the intent of this Planning Agreement. The persons currently occupying the above named positions are set out in Appendix A to this Planning Agreement.

Article IV. Use of Investigational Drugs

(a) One or more drugs designated by the United States Food and Drug Administration (FDA) as investigational may be necessary for the management of patients with internal radiation contamination. Since the Group Leader and the full time physicians on the staff of the Occupational Medicine Group are specifically identified on the applicable Investigational Drug Authorization filed with the FDA to administer these specialized agents, the Laboratory's medical staff shall be accorded the privilege of participating in the care of Laboratory workers admitted to the Hospital in connection with a radiation accident. These privileges apply in particular to the administration of FDA

approved investigational drugs useful in the treatment of internal contamination but are not limited solely to this purpose.

(b) It is understood that drugs designated by FDA as investigational must be administered under conditions of informed consent, and the Hospital agrees to take the necessary steps to develop an acceptable informed consent procedure to avoid unnecessary administrative delay at the time of actual patient care.

Article V. Public Information and Releases

The Hospital shall not discuss with representatives of the news media the details of any radiation accident occurring at the Los Alamos National Laboratory and any such inquiries shall be referred immediately to DOE. DOE shall assume responsibility for notifications required in connection with a radiation accident within the scope of this Planning Agreement. DOE shall instruct the Hospital on what information can be made public.

Article VI. Security

Nothing in this Planning Agreement authorizes access to or disclosure of classified information required to be protected in accordance with federal law or regulation in the interest of national security. The Hospital agrees to comply with, and to assure that its personnel participating in any training hereunder at the Los Alamos National Laboratory comply with, all applicable

security regulations and requirements of the DOE pertaining to their conduct while on DOE property.

Article VII. Amendment and Termination

This Planning Agreement may be amended by written agreement between LAAO and the Hospital and may be terminated by mutual agreement between LAAO and the Hospital or by either party upon thirty days written notice to the other party.

Articel VIII. Termination

The Planning Agreement shall continue in effect until such time as either LAAO or the Hospital desire its termination.

IN WITNESS WHEREOF, LAAO and the Hospital have executed this Planning Agreement in its several counterparts.

LOS ALAMOS AREA OFFICE

BY: _____
Area Manager

DATE: 11-29-85

LOS ALAMOS MEDICAL CENTER

BY: _____
Administrator

DATE: 11/27/85

Agreement No. DE-GM32-86AL37090

APPENDIX A

Los Alamos Medical Center Administrator	Glen Bryant
Los Alamos Area Office Area Manager	Harold E. Valencia
Los Alamos National Laboratory Group Leader - HSE-2	Dr. Samuel R. Ziegler