



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI
1445 ROSS AVENUE, SUITE 1200
DALLAS, TEXAS 75202

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LAWS
Permit

PA
HSWA 89
Draft permit
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CONFIDENTIAL

MAY 04 1989

Mr. Boyd Hamilton, Program Manager
Hazardous Waste Section
Environmental Improvement Division
The Health and Environmental Department
P.O. Box 968
Santa Fe, New Mexico 87504-0968

RE: Los Alamos National Laboratory
Draft HSWA Permit

Dear Mr. Hamilton:

I have enclosed the "Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments of RCRA" as they apply to the draft permit for Los Alamos National Laboratory (NM0890010515). If you have any questions concerning this permit, please contact me or Richard Mayer of my staff at (214) 655-6785.

Sincerely yours,

W K Honker
William K. Honker, Chief
RCRA Permits Branch

Enclosure

RECEIVED

MAY 08 1989

HAZARDOUS WASTE SECTION

XC To Espanola Library
5/12/89
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SPECIAL CONDITIONS PURSUANT TO THE 1984 HAZARDOUS AND SOLID WASTE AMENDMENTS TO RCRA FOR LOS ALAMOS NATIONAL LABORATORY

A. SPECIFIC CONDITIONS

1. Waste Minimization

The Permittee shall certify annually by October 1, for the previous year ending August 31, that:

- (a) the Permittee has a program in place to reduce the volume and toxicity of all hazardous wastes which are generated by the Permittee's facility's operation to the degree determined to be economically practicable; and
- (b) the proposed method of treatment, storage, or disposal is that practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment.

The Permittee shall include the certification in the operating record.

2. Dust Suppression

Pursuant to 40 CFR 266.23(b), the Permittee shall not use waste or used oil or any other material, which is contaminated with dioxin, PCB, or any other hazardous waste (other than a waste identified solely on the basis of ignitability), for dust suppression or road treatment.

3. Permit Review

This permit will be reviewed by the Administrative Authority five years after the date of permit issuance and will be modified as necessary as provided for in 40 CFR 270.41.

4. Solid Waste Management Units

The Permittee shall within 24 hours of discovery notify the Administrative Authority of any release of hazardous waste or hazardous constituents from any Solid Waste Management Unit (SWMU) at the facility regardless of when the release occurred or may have occurred, and regardless of when the waste was placed in the unit. Releases occurring from any SWMU will constitute grounds for a major permit modification as necessary to incorporate into the permit appropriate corrective action, or other actions as deemed necessary by the Administrative Authority. Pursuant to such permit modification, the Permittee shall then take timely corrective action for such releases. Also, if the Permittee knows or receives knowledge of any SWMU not addressed in the RCRA Facility Assessment, the Permittee shall:

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- (a) within 24 hours notify the Administrative Authority, and
- (b) within forty-five (45) days of having knowledge of a solid waste management unit, the Permittee shall submit a preliminary assessment of information in writing (Requirements in 40 CFR 270.14 (d) 50 FR 45788, December 1, 1987) regarding the SWMU to determine if there has been or is currently a release from the unit. The Permittee shall contact the Administrative Authority for guidance regarding the required information to be submitted. Based upon this information, the Administrative Authority may modify this permit as necessary.

5. Compliance with Permit

Compliance with this permit during its term constitutes compliance, for the purposes of enforcement, with 40 CFR Parts 264 and 266 only for those management practices specifically authorized by this permit. The Permittee is also required to comply with Parts 260, 261, 262, and 263 to the extent the requirements of those Parts are applicable.

6. Definitions

Administrative Authority - The Director of the New Mexico Environmental Improvement Division, or his/her designee or in case of HSWA provisions (Sections _____) for which the State is not authorized, the U.S. Environmental Protection Agency shall be the Administrative Authority.

7. Specific Waste Ban

- (a) The Permittee shall not place in any land disposal unit the wastes specified in RCRA Section 3004 after the effective date of the prohibition unless the Administrator has established disposal or treatment standards for the hazardous waste and the Permittee meets such standards and other applicable conditions of this permit.
- (b) The Permittee may store wastes restricted under 40 CFR 268 solely for the purpose of accumulating quantities necessary to facilitate proper recovery, treatment, or disposal provided that it meets the requirements of 40 CFR 268.50 (a) (2) including but not limited to clearly marking each tank or container.
- (c) The Permittee is required to comply with the all the requirements of 40 CFR 268.7 as amended. Changes to the waste analysis plan will be processed as minor modifications, pursuant to 40 CFR 270.42.
- (d) The Permittee shall perform a waste analysis at least annually to determine whether the waste meets applicable treatment standards. Results shall be maintained in the

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operating record, or on each batch as necessary.

- (e) Compliance with a RCRA permit during its term constitutes compliance, for the purpose of enforcement, with Subtitle C of RCRA except for those requirements not included in the permit which become effective by statute, or which are promulgated under Part 268 of this chapter restricting the placement of hazardous wastes in or on the land.

8. Closure

Pursuant to Section 3005 (j)(1) of the Hazardous and Solid Waste Amendments of 1984, the Permittee shall close surface impoundment(s) in existence on November 8, 1984 and qualifying for interim status (see Federal Register 24717-24720, 6/30/88) in accordance with the following provisions:

- (a) The Permittee shall not place hazardous waste in the surface impoundment(s); and
- (b) The Permittee shall close the surface impoundment(s) in accordance with the closure plan(s) approved by the New Mexico Environmental Improvement Division.

9. Operation of Land Disposal

The Permittee shall not place hazardous waste in any surface impoundment or landfill unless such unit has a permit meeting the Minimum Technological Requirements outlined in Section 3004(o) of the Resource Conservation and Recovery Act. The Administrative Authority must approve the plans and specifications for retrofitting prior to commencement of construction.

10. Additional Waste Ban Requirements

The Permittee shall not land dispose any hazardous waste restricted by 40 CFR 268 unless:

- (a) the waste meets treatment standards specified in 40 CFR 268.40, .41, .42, or .43;
- (b) a variance from the treatment standards has been granted pursuant to 40 CFR 268.44;
- (c) a petition has been granted on a case-by-case extension to the effective date, pursuant to 40 CFR 268.5;
- (d) a "no-migration" petition has been granted pursuant to 40 CFR 268.6; or
- (e) the surface impoundment is exempt under 40 CFR 268.4.

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B. SPECIAL PERMIT CONDITIONS

Within the designated timeframes the Permittee shall undertake the following measures concurrent with the RCRA Facility Investigation required in part C. Each submittal shall be clearly referenced as to the requirement which is being fulfilled.

Perched Zone Monitoring

In order to determine the extent of downgradient saturation and contamination, the Permittee shall install, at a minimum, the following wells and borings in the perched saturated alluvium in the specified canyons, within 90 days of the effective date of this permit;

- a) PUEBLO CANYON
1 exploratory boring near TW-1A
- b) LOS ALAMOS CANYON
1 monitoring well near LAO-3
1 monitoring well near LAO-4.5
1 monitoring well near Lao-5
- c) SANDIA CANYON
1 monitoring well near PM-1
1 monitoring well near PM-3
- d) MORTENDAD CANYON
1 monitoring well near MCO-4
1 monitoring well near MCO-6
1 monitoring well near MCO-7.5
- e) POTRILLO CANYON
1 monitoring well near State Road 4
- f) FENCE CANYON
1 monitoring well near State Road 4
- g) WATER CANYON
1 monitoring well near State Road 4
1 monitoring well approximately 1 mile west of State Road 4
1 monitoring well approximately 2 miles west of State Road 4

Within 30 days of installation of wells, the Permittee shall have gathered groundwater elevation data, and developed and submitted a map to the Administrative Authority which delineates the known extent of perched groundwater at the facility. Within 90 days of installation of wells, the Permittee shall sample each well for Appendix IX constituents, Gross Gamma, Gross Alpha, Total U, ³H, ¹³⁷Cs, and ²³⁸, ²⁴⁰Pu. Analytical results from those samples shall be sent to the Administrative Authority within 120 days of well installation.

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If wells are not installed in the above referenced saturated zones, the Permittee shall provide sufficient evidence to the Administrative Authority that the referenced zones do not exist at that particular location. Upon approval by the Administrative authority the particular well(s) will be struck from further requirements.

The monitoring wells installed under this and following sections of this permit shall be constructed using flush-joint, internal upset, threaded (or an equivalent method of joining without rivets, screws and glues) casing manufactured from inert materials. The boreholes for casings and screens shall be a minimum of six (6) inches greater in diameter than the well casing or screen outer diameter. Filter pack and screen slot openings shall be sized based on formation grain size and characteristics. Well screen lengths shall be no more than (10) ten feet in length. The filter pack shall extend no more than (2) two feet above the top of the screen and shall not cross any clay layers which may act as aquitards. If a bentonite seal is used, the bentonite shall be allowed to hydrate a minimum of (12) twelve hours before emplacement of grout. Grout shall be emplaced using a tremie pipe to ensure a consistent seal at depths greater than 5 feet, and grout shall be allowed to set a minimum of twelve hours before initiating development.

Development procedures shall include purging of the well until contaminants introduced during drilling can be assured of being removed. Development shall also include surging with a surge plug, and either bailing or pumping until the nephelometric turbidity units (N.T.U.) can be consistently measured at five (5) or less, if possible. Well head construction shall include a well pad keyed into the well annulus and a system to secure the well from traffic and unauthorized access. Within thirty (30) days of construction and development of the last well required under this section, the Permittee shall submit to the Administrative Authority a report including:

- 1) surveyed location of each well
- 2) surveyed ground level, top of casing and top of well pad referenced to known elevation datum (NGVD, 1929);
- 3) static water level, referenced to mean sea level;
- 4) well construction data (including a diagram for each well (detailing total depth, screen placement, gravel pack, annular seal, borehole and casing size (all measured to within .1 foot), and well log; and;
- 5) well development data.

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MONITORING OF SURFACE AND GROUND WATER

Extensive monitoring of surface and ground water is now conducted and documented annually by the LANL Environmental Surveillance Program in accordance with DOE Orders. This program shall be continued in order to demonstrate protection of the main aquifer, and the annual reports must be submitted to EPA. Within 90 days of the effective date of this permit, the Permittee shall submit to the Administrative Authority a summary describing the ongoing monitoring program, including sampling points, media, and constituents analyzed for. If EPA determines that this ongoing monitoring program is not sufficient, then EPA may impose additional monitoring requirement as a modification to this permit.

SEDIMENT TRAPS MORTANDAD CANYON

The Permittee must, through the maintenance of existing sediment traps or construction of new sediment traps, attempt to insure containment of all residual sediment contamination within the facility boundary.

PROTECTION OF THE MAIN AQUIFER

Any boring drilled to a depth of 300 feet or deeper must grout in a surface casing to prevent any downward migration of surface contamination along the wellbore. Any boring drilled into the main aquifer that encounters perched water must set conductor pipe to the top of the main aquifer and hydraulically isolate the main aquifer from the perched aquifer. The annular space must be sealed with a bentonite grout or equivalent to prevent shrinkage cracking.

VADOSE ZONE RESEARCH INVESTIGATION AT TA-54

The Permittee shall continue the quarterly pore gas sampling program and resume the vadose zone plume delineation program at TA-54. Due to the unique hydrogeologic conditions throughout this facility, effective monitoring of the unsaturated zone will be essential for a successful RFI/CMS. The information gathered from this program now will help provide direction for investigations to be conducted during the RFI.

VERTICAL EXTENT OF SATURATION

The Permittee shall conduct a subsurface investigation of saturation by drilling test holes through the shallow alluvial perched aquifer in Mortandad Canyon. Construction of the test holes will hydraulically isolate the perched aquifer from the underlying unsaturated tuff. This perched aquifer is recharged in part from wastewater treatment discharges located upstream. The investigation shall provide an initial evaluation of the maximum extent of the vertical and horizontal water and contaminant movement into the unsaturated tuff beneath the saturated alluvium. The study should attempt to recover cores from the tuff to be used to determine laboratory values for unsaturated hydraulic conductivity conductance, specific retention and specific yield, effective porosity and saturated permeability. The boring should be analyzed for applicability of installation of neutron

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moisture probe access tubes to determine moisture over time. Chemical and radiochemical analyses of the cores shall also be made to assist in the determination of fluid movement from the perched alluvial aquifer into the underlying unsaturated tuff. The chemical analysis shall include Appendix IX constituents, while the radiochemical analysis shall include ^3H , ^{137}Cs , Total U, ^{238}Pu , $^{239,240}\text{Pu}$, ^{241}Am , Gross Gamma, and Gross Alpha.

QA/QC EVALUATION

Within 90 days of issuance of this permit, the Permittee shall develop and submit to the Administrative Authority a complete detailed QA/QC description of current RCRA/HSWA field sampling and laboratory analysis procedures.

IDENTIFICATION AND SUMMARY OF PREVIOUS STUDIES

Within 120 days of the effective date of this permit, the Permittee shall develop and submit to the Administrative Authority, a reference of all known geologic, hydrogeologic and all environmental studies relevant to potential contamination or migration of contamination from SWMUs, previously performed at and/or by the facility, with a summary of the scope of the study, and significant findings thereof.

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C. CORRECTIVE ACTION FOR CONTINUING RELEASES

Section 3004 (V) or RCRA (Section 207 of the Hazardous and Solid Waste Amendments of 1984) and federal regulations promulgated as 40 CFR 264.101, require corrective action beyond the facility boundary, where necessary to protect human health and the environment, unless the owner or operator was unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the facility boundary where offsite access is denied.

Section 3004(u) of RCRA (Section 206 of the Hazardous and Solid Waste Amendments of 1984) and federal regulations promulgated as 40 CFR 264.101 require corrective action as necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any SWMU, regardless of when waste was placed in the unit, for all permits issued after November 8, 1984.

This section of the permit requires the Permittee to perform a RCRA Facility Investigation or the equivalent thereof (OTET) to address known or suspected releases from specified SWMUs to affected media (i.e., soil, groundwater, surface water and air). For these units, corrective measures will be proposed by the Permittee as warranted by the results of the RFI (OTET).

Failure to submit the required information or falsification of any submitted information is grounds for termination of this permit (40 CFR 270.43). The Permittee shall certify all information submitted as required by 40 CFR 270.11(d).

The required information shall include each item specified under RFI Tasks I-V and CMS Tasks VI-X (OTET). Since these required items are essential elements of this permit, failure to submit any of these elements or submission of inadequate or insufficient information may subject the Permittee to enforcement action under Section 3008 of RCRA which may include fines, suspension or revocation of the permit.

If the Administrative Authority finds that corrective measures are warranted after the approval of the RFI report (OTET), the Administrative Authority will propose a permit modification and follow appropriate procedures including a public notice period and a public hearing, if warranted.

The Permittee shall undertake and complete each of the following actions to the satisfaction of the Administrative Authority and in accordance with the terms and procedures set forth in Condition Scope of Work for a RCRA Facility Investigation (OTET). If the Permittee believes that certain requirements are not applicable, the specific requirements shall be identified and the rationale for inapplicability shall be provided.

The Permittee may propose as the equivalent process the applicable portions of the ongoing U.S. Department of Energy (DOE) Environmental Restoration (ER) Program which is patterned after and also complies with the CERCLA remedial process. EPA will evaluate the process for equivalency with RCRA requirements.

The Los Alamos National Laboratory (LANL) is implementing the ER Program as a number of tasks (approximately 50) due to the large number of potential release sites at LANL. The ER Program strategy for dealing with the large number of tasks is to prepare a single installation-wide work plan and task-specific RI/FS documents for each task. These documents and their associated activities shall be equivalent to those described in the Scope of Work for a RCRA Facility Investigation and the Scope of Work for a RCRA Corrective Measure Study.

The LANL installation RI/FS Work Plan must contain the programmatic elements of the RFI Work Plan, installation-wide descriptions of the current conditions, tabular summaries (site type, type and volumes of waste, potential contaminants, potential remedial action, and annual site status) of the potential release sites (by task), prioritization of sites/tasks, and a work schedule. The task specific RI/FS documents/process shall contain all the site specific elements of the RFI. The LANL installation RI/FS work plan shall contain outlines for the task-specific RI/FS documents to demonstrate equivalency to RFI and CMS documents.

The LANL Installation RI/FS Work Plan shall be updated annually, as appropriate. The work schedule shall be depicted on a time scale format, and will be seven (7) years in length. The current fiscal year shall be shown on a monthly time scale, in sufficient detail to identify all CERCLA primary document submittals (task/site sampling and analysis plans, task/site Remedial investigation reports, and task/site Feasibility Study reports), major milestones (start and finish of Task/Site RI/FS's), and Interim milestones (Draft Primary documents and Final Primary Documents; Start and Completion or Field Activities). The second year shall be shown on a quarterly scale, with the remaining five years on an annual scale in sufficient detail to identify major milestones for all primary document submittals. In addition, a listing describing each of the milestones depicted on the work schedule (each task) shall be provided.

The work schedule shall be updated, at a minimum, annually with the primary purpose to expand the new current fiscal year and follow-on year, and add an additional year at the end. In addition, any approved schedule changes shall be incorporated at this time, if not previously incorporated. This annual update shall be performed in the fourth quarter of the previous fiscal year. The draft LANL installation RI/FS workplan shall be submitted to the Administrative Authority by September 1 of each year. The work schedule may be revised at any time during the year for significant changes (e.g., major change in funding). The annual updates, or revisions due to significant changes, to the work schedule shall require new approval by the Administrative Authority.

1. RCRA Facility Investigation (RFI) or the Equivalent Thereof

(a) Preliminary Report (LANL Installation RI/FS Work Plan)

Within one hundred eighty (180) days of the effective date of this permit, the Permittee shall submit to the Administrative Authority a Preliminary Report describing the current conditions at the facility as outlined in the RFI scope of work, Condition ____, Task I (OTET). The Preliminary Report is limited to SWMUs not identified in the Part B or to recent information not addressed in the RCRA Facility Assessment or in the LANL December 1988 SWMU report. The Preliminary Report shall address the background information pertinent to the facility and the nature and extent of contamination.

(b) RFI Work Plan (LANL Installation RI/FS Work Plan)

Within one hundred eighty (180) days of the effective date of this permit, the Permittee shall submit to the Administrative Authority for approval a RFI Work Plan, as outlined in the RFI scope of work, Condition ____, Task II (OTET). The scope of the RFI (OTET) shall include units and releases to the affected media specified in the LANL Installation RI/FS Work Plan, which shall be updated and approved annually.

After the Permittee submits the RFI Work Plan (OTET), the Administrative Authority will approve, disapprove or modify the plan. If the Administrative Authority approves the plan, the Permittee shall immediately initiate implementation of the plan according to the schedule contained therein.

In the event of disapproval (in whole or in part) of the plan, the Administrative Authority shall specify any deficiencies in writing. The Permittee shall modify the plan to correct these within 30 days of receipt of the disapproval by the Administrative Authority. If more than 30 days is required, the Permittee must provide a written request for time extension with justification for the extension. The modified plan shall be submitted in writing to the Administrative Authority for review. Should the Permittee take exception to all or part of the disapproval, the Permittee shall submit to the Administrative Authority a written statement of the grounds for the exception within 15 days of receipt of the disapproval by the Administrative Authority.

If disagreements cannot be resolved the Administrative Authority shall make further modifications as required. If the Administrative Authority modifies the plan, this modified plan becomes the approved RFI Work Plan (OTET). The Permittee shall immediately initiate implementation of the approved RFI Work Plan (OTET) according to the schedule contained therein.

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(c) RFI Work Plan (LANL Task/Site RI/FS Documents)

The Permittee shall submit to the Administrative Authority for approval an RFI Work Plan as outlined in the RFI scope of work, Condition _____, Task II (OTET). The scope of the RFI Work Plan must address all necessary action to verify and determine the nature and extent of releases of hazardous waste or hazardous constituents from solid waste management units. The RFI shall gather all necessary data to support the Corrective Measures Study (CMS) described below. The CMS will be required if the data gathered during the RFI is, in the judgement of the Administrative Authority, sufficient to require one. The scope of the RFI shall include, but not be limited to, the following units and include releases to all media (see Tables A & B, pages 12-16). Table A identifies all SWMU's required for an RFI under this permit. Table B is a subset of table A and contains the priority SWMU's. The SWMU's in those tables are numbered using the LANL SWMU Report, December, 1988.

- (1) The Permittee shall include in the Task/Site RFI Workplans within 1 year of the effective date of the permit, 10% of those SWMUs listed in Table A. This Workplan shall include 20% of those SWMUs listed in Table B (Table B is a subset of Table A).
- (2) The Permittee shall include in the RFI Task/Site Workplans within 2 years of the effective date of the permit, an additional 25% (cumulative total of 35%) of those SWMUs listed in Table A. This Workplan shall include an additional 35% (cumulative total of 55%) of those SWMUs listed in Table B.
- (3) The Permittee shall include in the Task/Site RFI Workplans within 3 years of the effective date of the permit, an additional 20% (cumulative total of 55%) of those SWMUs listed in Table A. This Workplan shall include the remaining 45% (cumulative total 100%) of those SWMUs listed in Table B.
- (4) The Permittee shall include in the Task/Site RFI Workplans within 8 years of the effective date of the permit, all SWMUs (cumulative total 100%) listed in Table A. SWMUs identified after the LANL SWMU Report, December, 1988 may be required to do an RFI, if deemed necessary by the Administrative Authority.

Table A

Technical Area 0

SWMU Number

0-001
0-002
0-003
0-005
0-006
0-007
0-009
0-012
0-014
0-017

Technical Area 1

1-001 (a-n)
1-002
1-003

Technical Area 2

2-005
2-007
2-008
2-009 (a-c)

Technical Area 3

3-001 (a-c)
3-001 (m)
3-001 (p)
3-001 (r)
3-002 (b-c)
3-003 (a-c)
3-009 (a-h)
3-010
3-012 (a-b)
3-013
3-014 (a-u)
3-015
3-018
3-020
3-028
3-029 (a-b)
3-033
3-035 (a-b)
3-036 (a)
3-036 (d-e)

Technical Area 3 Cont.

3-037
3-038 (a-b)
3-039
3-044

Technical Area 4

4-001
4-002

Technical Area 5

5-001 (a-b)
5-002
5-003
5-004
5-005

Technical Area 6

6-001 (a-b)
6-002
6-003 (c)
6-006
6-007

Technical Area 7

7-001 (a-b)

Technical Area 8

8-002
8-003 (a-c)
8-004 (a-d)
8-006 (a-b)
8-007

Technical Area 9

9-003 (a-f)
9-004 (a-o)
9-005 (a-h)
9-006
9-007
9-008
9-009

Technical Area 10

10-001 (a-d)
10-002 (a-b)
10-003 (a-f)
10-004 (a-b)
10-006

Technical Area 11

11-001 (a-c)
11-002
11-004 (a-e)
11-005 (a-b)
11-006
11-007
11-009

Technical Area 12

12-001 (a)
12-001 (b)

Technical Area 13

13-002
13-004

Technical Area 14

14-002 (a-f)
14-004 (b)
14-005
14-007

Technical Area 15

15-002
15-003
15-004 (e)
15-006 (a-d)
15-007 (a-d)
15-008
15-009
15-010 (a-c)
15-011 (a-c)
15-012 (a-g)

Technical Area 16

16-001 (b-e)
16-003 (a-v)
16-004 (a-f)
16-006 (a-h)
16-007
16-008 (a-b)

Technical Area 16 Cont.

16-009 (a-b)
16-010 (a-m)
16-012 (a-y)
16-013 (a-b)

16-016
16-018
16-019
16-020
16-021

Technical Area 18

18-001
18-002 (a-b)
18-003 (a-h)
18-004 (b)
18-005
18-007

Technical Area 19

19-001

Technical Area 20

20-001 (a-c)
20-002
20-003 (a)

Technical Area 21

21-002
21-003
21-005
21-006 (a-e)
21-007
21-010 (a-h)
21-011 (a-i)
21-012

21-013 (a-c)
21-014
21-015
21-016 (a-g)
21-017 (a-c)
21-018 (a-b)
21-021
21-022 (a-h)
21-023 (a-d)
21-024 (a-k)

Technical Area 22

22-005
22-006
22-007
22-008
22-009
22-010 (a-c)
22-011

Technical Area 27

27-001
27-002 (a-e)
27-003

Technical Area 31

31-001

Technical Area 32

32-002 (a-b)

Technical Area 33

33-001 (a-e)
33-002 (a-c)
33-004 (a-f)
33-007
33-008
33-009
33-010 (a-c)
33-011
33-012 (a)
33-013
33-014
33-017

Technical Area 35

35-002
35-003 (a-q)
35-004 (e)
35-005 (a-b)
35-006
35-008
35-009 (a-h)
35-010 (a-d)
35-014
35-015 (b)

Technical Area 36

36-001
36-002

36-003 (a-c)
36-005

Technical Area 39

39-001 (a-e)
39-002 (a)
39-002 (c)
39-003
39-004 (c-e)
39-006 (a-b)

Technical Area 40

40-001 (a-c)
40-003 (a)
40-004
40-005
40-006 (a-c)
40-009

Technical Area 41

41-001
41-002 (a-c)

Technical Area 43

43-001

Technical Area 45

45-001
45-002
45-003

Technical Area 46

46-002
46-003 (a-g)
46-004 (a-h)
46-005
46-006 (a-d)
46-007
46-008 (a-f)

Technical Area 48

48-002 (a-b)
48-003 (a-b)
48-005

Technical Area 49

49-001
49-003

Technical Area 50

50-001
50-002 (a-d)
50-004
50-006
50-009
50-011 (a-c)

Technical Area 52

52-001 (a-d)
52-002 (a-k)

Technical Area 53

53-001 (a)
53-001 (b)
53-002 (a-b)
53-005
53-006 (b-e)
53-007 (a-b)

Technical Area 54

54-001 (a)
54-001 (c)
54-003 (a-b)
54-004
54-005
54-006
54-007 (a-c)
54-013

Technical Area 59

59-001

Table B - Priority SWMUs

<u>SWMU No.</u>	<u>SWMU No.</u>
005 (a-b)	35-010 (a-d)
007	39-001 (a-e)
009	46-002
1-001 (a-n)	46-006 (a-d)
1-002	46-007
2-005	49-001
2-008	50-006
3-010	50-009
3-012 (a-b)	54-003 (a-b)
3-013	54-004
3-015	54-005
3-029 (a-b)	54-006
5-005	33-002 (a-c)
6-007	33-017
8-003 (a-c)	35-005 (a-q)
8-007	35-006
9-008	36-003 (a-c)
9-009	41-001
10-003 (a-f)	35-003 (a-q)
10-006	3-020
11-004 (a-c)	
11-005 (a-b)	
11-006	
13-004	
15-002	
15-006 (a-d)	
15-007 (a-d)	
15-008	
15-009	
15-012 (a-g)	
16-001 (b-e)	
16-006 (a-h)	
16-007	
16-008 (a-b)	
16-016	
16-018	
16-019	
16-020	
16-021	
18-001	
18-003	
21-006 (a-e)	
21-010 (a-h)	
21-011 (a-i)	
21-012	
21-014	
21-015	
21-016 (a-g)	
21-017 (a-c)	
21-018 (a-b)	
22-008	

After the Permittee submits the RFI Work Plan (OTET), the Administrative Authority will approve, disapprove, or modify the plan. If the Administrative Authority approves the plan, the Permittee shall immediately initiate implementation of the plan according to the schedule contained therein. Approved workplans are incorporated into this permit.

In the event of disapproval (in whole or in part) of the plan, the Administrative Authority shall specify any deficiencies in writing. The Permittee shall modify the plan to correct these within 30 days of receipt of the disapproval by the Administrative Authority. If more than 30 days is required, the Permittee must provide a written request for time extension, with justification for the extension. The modified plan shall be submitted in writing to the Administrative Authority for review. Should the Permittee take exception to all or part of the disapproval, the Permittee shall submit to the Administrative Authority a written statement of the grounds for the exception within 15 days of receipt of the disapproval by the Administrative Authority.

If disagreements cannot be resolved, the Administrative Authority shall make further modifications as required. If the Administrative Authority modifies the plan, this modified plan becomes the approved RFI Work Plan (OTET). The Permittee shall immediately initiate implementation of the approved RFI Work Plan (OTET) according to the schedule contained therein.

The Permittee shall prepare the RFI Work Plan (OTET) and undertake the facility investigation in accordance with the following:

- (i) Development of the RFI Work Plan (OTET) and reporting of data shall be consistent with the RCRA Facility Investigation Guidance Document (EPA OSWER Directive 9502.00-6c) or the equivalent thereof;
- (ii) EPA and the NMEID reserve the right to split samples with the Permittee. The Permittee shall notify EPA and the NMEID at least 10 days prior to any sampling activity which has been identified from the field sampling plan by EPA or NMEID for split sampling.
- (iii) When developing groundwater related investigations, the permittee shall be consistent with the RCRA Groundwater Monitoring Technical Enforcement Guidance Document (EPA OSWER Directive 9950-1, September 1986) or the equivalent thereof to determine methods and materials that are acceptable to EPA;

- (iv) Any schedule deviations from the approved RFI Work Plan (OTET) which are necessary during implementation of the facility investigation shall be fully documented and described in the monthly reports and in the draft RFI report. Technical deviations from the approved RFI Workplan (OTET) shall be fully documented and described in the draft RFI report (OTET).
- (d) The Permittee shall submit a draft RFI report (OTET) to the Administrative Authority in accordance with the schedule in the RFI Work Plan (OTET). The draft report shall include all the results from the facility investigation described in Condition ____, Task III (OTET). An extension of the time required to submit the draft RFI report (OTET) may be obtained only through the Permittee's written request and the approval of the Administrative Authority.
- (e) After the Permittee submits the RFI report (OTET), the Administrative Authority will either approve or disapprove the adequacy of the report. If the Administrative Authority disapproves the report, the Administrative Authority shall specify the deficiencies and the Permittee shall have thirty (30) days to submit a modified report. If this report is not approved, the Administrative Authority may make further modifications as required. If the Administrative Authority modifies the report, this modified report becomes the approved RFI report (OTET).
- (f) The Permittee shall submit one or more Task/Site Workplans for studies to evaluate the 15 major drainage areas or Canyon systems at the facility. These studies must address each system as an integrated unit and evaluate them for potential impacts of contaminants from SWMUs. The plans must address the existence of contamination and the potential for movement or transport Canyon watersheds, and interactions with the alluvial aquifers and the main aquifer. The studies shall evaluate the potential for offsite exposure through these pathways including the ground water and possible impacts on the Rio Grande.

2. Corrective Measures Study

- (a) If the Administrative Authority determines the need for corrective measures based on the results of the RFI (OTET), the Administrative Authority will notify the Permittee of this in writing. The Permittee shall submit within ninety (90) days of such notification a draft Corrective Measures Study report (CMS) (OTET) to the Administrative Authority for approval. If more than 90 days is required, the Permittee must provide a written request for time extension with justification for the extension. The scope of the CMS (OTET) should be as outlined in the Scope of Work for Corrective Measure Study, Condition ___ (OTET), to develop and evaluate the corrective action alternatives and to recommend corrective measures to be taken at the facility.
- (b) After the Permittee submits the draft CMS report (OTET) the Administrative Authority will either approve or disapprove the report. If the Administrative Authority disapproves the report, the Administrative Authority will specify the deficiencies and the Permittee shall have thirty (30) days to submit the modified report. If more than 30 days is required, the Permittee must provide a written request for time extension with justification for the extension. If this report is not approved, the Administrative Authority may make further modifications as required. If the Administrative Authority modifies the report, this modified report becomes the approved CMS report (OTET). The Administrative Authority will then select, from the CMS report (OTET), the Corrective Measure alternative best suited to protect human health and the environment. The Administrative Authority will propose a permit modification and follow appropriate procedures including a public notice period and a public hearing, if requested.

D. SCHEDULES OF COMPLIANCE

All plans required in Condition ____, CORRECTIVE ACTION FOR CONTINUING RELEASES, shall contain time schedules, including interim milestones for completing specified activities. The time between LANL Installation RI/FS Work Plan interim milestones shall not exceed one year.

The Permittee shall submit a copy of all draft and final plans and draft and final reports to the New Mexico Environmental Improvement Division at such time such plans and reports are submitted to the U.S. Environmental Protection Agency, Region 6.

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date as required by 40 CFR 270.30(k)(5).

Any failure by the Permittee to adhere to the major milestones established in this permit or in the approved RFI Work Plan shall constitute a violation of the permit and shall subject the Permittee to enforcement action at the discretion of the Administrative Authority.

E. PERMIT MODIFICATION

This permit shall be modified pursuant to 40 CFR 270.41 to incorporate the Corrective Measures developed under Condition ____ and financial assurance for corrective measures implementation as required under 40 CFR 264.101 (Amendments to 40 CFR, July 15, 1985, 50 Federal Register 28747).

SCOPE OF WORK FOR A RCRA FACILITY INVESTIGATION (RFI)
AT
LOS ALAMOS NATIONAL LABORATORY

PURPOSE

The purpose of this RCRA Facility Investigation is to determine the nature and extent of releases of hazardous waste or hazardous constituents from solid waste management units. The Permittee shall furnish all personnel, materials, and services necessary for, or incidental to, performing the RCRA Facility Investigation at Los Alamos National Laboratory.

If the Permittee believes that certain requirements of the scope of work are not applicable, the specific requirements shall be identified and the rationale for inapplicability shall be provided. The scope of work should be modified as necessary to require only that information necessary to complete the RCRA RFI (OTET) for each individual task. The EPA will review the scope of work to determine if specific requirements are applicable.

SCOPE

The RCRA Facility Investigation (RFI) consists of five (5) tasks. Those tasks, and the ER program documents that must be equivalent to the RFI documents/activities are listed on the following page. The Permittee shall prepare a single installation-wide work plan, which shall be updated annually, and task-specific RI/FS for each task. The installation-wide work plan together with the RI/FS documents for a task must complete the RFI equivalent document set for a task. The installation-wide work plan shall contain programmatic operating procedures, tabular summaries of the potential release sites, prioritization of the sites/tasks, and a work schedule by task (including a current year work plan). The task-specific RI/FS documents/activities shall be prepared as tasks are implemented. The detailed outlines for the task-specific RI/FS documents shall be provided in the installation-wide work plan.

Scope of the RFI	ER Program Equivalent	
<p><u>The RCRA Facility Investigation consists of five tasks:</u></p> <p>Task I: Description of Current Conditions</p> <ul style="list-style-type: none"> A. Facility Background B. Nature and Extent of Contamination 	<p><u>LANL Installation RI/FS Work Plan</u></p> <p>I. LANL Installation RI/FS Work Plan</p> <ul style="list-style-type: none"> A. Installation Background B. Tabular Summary of Contamination by Site 	<p><u>LANL Task/Site RI/FS</u></p> <p>I. Quality Assurance Project Plan</p> <ul style="list-style-type: none"> A. Task/Site Background B. Nature and Extent of Contamination
<p>Task II: RFI Workplan</p> <ul style="list-style-type: none"> A. Data Collection Quality Assurance Plan B. Data Management Plan C. Health and Safety Plan D. Community Relations Plan 	<p>II. LANL Installation RI/FS Work Plan</p> <ul style="list-style-type: none"> A. General Standard Operating Procedures for Sampling, Analysis and Quality Assurance B. Technical Data Management Program C. Health and Safety Program D. Community Relations Program 	<p>II. LANL Task/Site RI/FS Documents</p> <ul style="list-style-type: none"> A. Quality Assurance Project Plan and Field Sampling Plan B. Technical Data Management Plan C. Health and Safety Plan D. Community Relations Plan
<p>Task III: Facility Investigation</p> <ul style="list-style-type: none"> A. Environmental Setting B. Source Characterization C. Contamination Characterization D. Potential Receptor Identification 	<p>III.</p>	<p>III. Task/Site Investigatoin</p> <ul style="list-style-type: none"> A. Environmental Setting B. Source Characterization C. Contamination Characterization D. Potential Receptor Identification
<p>Task IV: Investigative Analysis</p> <ul style="list-style-type: none"> A. Data Analysis B. Protection Standards 	<p>IV.</p>	<p>IV. LANL Task/Site Investigative Analysis</p> <ul style="list-style-type: none"> A. Data Analysis B. Protection Standards
<p>Task V: Reports</p> <ul style="list-style-type: none"> A. Preliminary and Workplan B. Progress C. Draft and Final 	<p>V. Reports</p> <ul style="list-style-type: none"> A. LANL Installation RI/FS Work Plan B. Annual Update of LANL Installation RI/FS Work Plan C. Draft and Final 	<p>V. LANL Task/Site Reports</p> <ul style="list-style-type: none"> A. Quality Assurance Project Plan, Field Sampling Plan, Technical Data Management Plan, Health and Safety Plan, Community Relations Plan B. LANL Task/Site RI/FS Documents and LANL Monthly Management Status Report C. Draft and Final

TASK I: PRELIMINARY REPORT: DESCRIPTION OF CURRENT CONDITIONS

The Permittee shall submit to the Administrative Authority a Preliminary Report providing the background information pertinent to the facility, contamination and any type of on-going corrective action as set forth below. This report is limited to SWMUs not identified in the Part B permit application or to recent information not addressed in the RCRA Facility Assessment, or in the LANL December 1988 SWMU report.

A. Facility Background

The Permittee report shall summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility for the treatment, storage or disposal of solid and hazardous waste. The Permittee's report shall include:

1. Map(s) depicting the following:
 - a. General geographic location;
 - b. Property lines, with the owners of all adjacent property clearly indicated;
 - c. Topography (with a contour interval of five (5) or ten (10) feet and a scale of 1 inch = 100 feet), waterways, all wetlands, floodplains, water features, drainage patterns;
 - d. All solid waste management units;
 - e. All known past solid or hazardous waste treatment, storage or disposal areas regardless of whether they were active on November 19, 1980;
 - f. Surrounding land uses (residential, commercial, agricultural, recreational); and
 - g. The location of all production and groundwater monitoring wells. These wells shall be clearly labeled and ground and top of casing elevations included (these elevations may be included as an attachment);
 - h. A detailed geologic map overlain on contour map (contour interval at least 10') with a scale of 1" = 400' depicting all units of the Tshirege member of the Bandelier Tuff. Maps must depict all springs, faults, gravel deposits, alluvium, and pumice deposits.

All maps shall be consistent with the requirements set forth in 40 CFR §270.14 and be of sufficient detail and accuracy to locate and report all current and future work performed at the site;

2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the facility;
3. Approximate dates or periods of past waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted (local, state, or federal response units or private parties), including any inspection reports or technical reports generated as a result of the response.

B. Nature and Extent of Contamination

The Permittee shall include in the Preliminary Report the existing information on the nature and extent of contamination.

1. The Permittee's report shall summarize all possible source areas of contamination. This, at a minimum, should include all solid waste management units. For each area, the Permittee shall identify the following:
 - a. Location of unit/area (which shall be depicted on a facility map);
 - b. Quantities of solid and hazardous wastes;
 - c. Hazardous waste, radiochemical and hazardous constituents, to the extent known; and
 - d. Identification of areas where additional information is necessary.
2. The Permittee shall prepare an assessment and description of the existing degree and extent of contamination. This should include:
 - a. Available monitoring data and qualitative information on locations and levels of contamination at the facility;
 - b. All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality; and
 - c. The potential impact(s) on human health and the environment, including demography, groundwater and surface-water use, and land use.

C. Summary Identification of Other Permits

A summary of past and present permits requested, received, and/or denied for all environmental media and enforcement actions associated with them. This must include State and Federal permits.

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D. Implementation of Interim Measures

The Permittee shall document and report on all interim measures which were or are being undertaken at the facility other than those specified in the permit. This shall include:

1. Objectives of the interim measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long term solution at the facility;
2. Design, construction, operation, and maintenance requirements;
3. Schedules for design, construction and monitoring; and
4. Schedule for progress reports.

TASK II: RFI WORKPLAN REQUIREMENTS

The Permittee shall prepare a RCRA Facility Investigation (RFI) Workplan. This RFI Workplan shall include the development of several plans, which shall be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RFI Workplan to increase or decrease the detail of information collected to accommodate the facility specific situation. The RFI Workplan shall include the following:

A. Data Collection Quality Assurance Plan

The Permittee shall prepare a plan to document all monitoring procedures: sampling, field measurements and sample analysis performed at the facility during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented.

1. Data Collection Strategy

The strategy section of the Data Collection Quality Assurance Plan shall include but not be limited to the following:

- a. Description of the intended uses for the data, and the necessary level of precision and accuracy for these intended uses;
- b. Description of methods and procedures to be used to assess the precision, accuracy and completeness of the measurement data;

2. Sampling and Field Measurements

The Sampling Field Measurements Section of the Data Collection Quality Assurance Plan shall at least discuss:

- a. Selecting appropriate sampling and field measurements locations, depths, etc.;
- b. Providing a statistically sufficient number of sampling and field measurement sites;
- c. Determining conditions under which sampling or field measurements should be conducted;
- d. Determining which parameters are to be measured and where;
- e. Selecting the frequency of sampling and length of sampling period;
- f. Selecting the types of sample (e.g., composites vs. grabs) and number of samples to be collected;
- g. Measures to be taken to prevent contamination of sampling or field measurements equipment and cross contamination between sampling points;
- h. Documenting field sampling operations and procedures;

- i. Selecting appropriate sample containers;
 - j. Sample preservation; and
 - k. Chain-of-custody.
3. Sample Analysis
- a. Chain-of-custody procedures;
 - b. Sample storage procedures and holding times;
 - c. Sample preparation methods;
 - d. Analytical procedures;
 - e. Calibration procedures and frequency;
 - f. Data reduction, validation and reporting; and
 - g. Internal quality control checks, laboratory performance and systems audits and frequency.

B. Data Management Plan

The Permittee shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation, such as:

1. Data Record
2. Tabular Displays
3. Graphical Displays

C. Health and Safety Plan

The Permittee shall prepare a facility Health and Safety Plan.

1. Major elements of the Health and Safety Plan shall include:
 - a. Facility description including availability of resources such as roads, water supply, electricity and telephone service;
 - b. Describe the known hazards and evaluate the risks associated with the incident and with each activity conducted;
 - c. List key personnel and alternatives responsible for site safety, responses operations, and for protection of public health;
 - d. Delineate work area;

- e. Describe levels of protection to be worn by personnel in work area;
 - f. Establish procedures to control site access;
 - g. Describe decontamination procedures for personnel and equipment;
 - h. Establish site emergency procedures;
 - i. Address emergency medical care for injuries and toxicological problems;
 - j. Describe requirements for an environmental field monitoring program;
 - k. Specify any routine and special training required for responders; and
 - l. Establish procedures for protecting workers from weather-related problems.
2. The Facility Health and Safety Plan shall be consistent with:
- a. NIOSH Occupation Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
 - b. EPA Order 1440.1 - Respiratory Protection;
 - c. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
 - d. Approved Facility Contingency Plan;
 - e. EPA Operating Safety Guide (1984);
 - f. OSHA regulations particularly in 29 CFR 1910 and 1926;
 - g. State and local regulations; and
 - h. Other EPA guidance as provided.

D. Community Relations Plan

The Permittee shall prepare a plan, for the dissemination of information to the public regarding investigation activities and results.

E. Project Management Plan

The LANL Installation RI/FS Workplan shall contain a Project Management Plan which will include a discussion of the technical approach, schedules, budget, and key projects. The Project Management Plan shall include a description of qualifications of key project performing or directing the RFI, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation. The Task specific Workplan must document any deviations from the Installation Workplan.

TASK III: FACILITY INVESTIGATION

The Permittee shall conduct those investigations of SWMUs previously identified with known or suspected releases of contamination as necessary to protect human health and the environment to: characterize the facility (Environmental Setting); define the source (Source Characterization); define the degree and extent of contamination (Contamination Characterization); and identify actual or potential receptors.

Investigations should result in data of adequate technical quality to support the development and evaluation of the corrective measure alternative or alternatives during the Corrective Measures Study, when necessary.

The facility investigation activities shall when conducted follow the plans set forth in Task II. All sampling and analyses shall be conducted in accordance with the Data Collection Quality Assurance Plan. All sampling locations shall be documented in a log and identified on a detailed site map.

A. Environmental Setting

The Permittee shall collect information to supplement and verify existing information on the environmental setting at the facility. The Permittee shall characterize the following:

1. Hydrogeology

The Permittee shall conduct a program to evaluate hydrogeologic conditions at the facility. This program shall provide the following information:

- a. A description of the regional and facility specific geologic and hydrogeologic characteristics affecting ground-water flow beneath the facility.
- b. An analysis of any topographic features that might influence the groundwater flow system. (Note: Stereographic analysis of aerial photographs may aid in this analysis).
- c. An analysis of fractures within the tuff, addressing tectonic trend fractures versus cooling fractures.
- d. Based on field data, tests, (gamma and neutron logging of existing and new wells, piezometers and borings) and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated units).
- e. Based on field studies and cores, structural geology and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways identifying:
 - i) Unconsolidated sand and gravel deposits;

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- ii) Zones of fracturing or channeling in consolidated or unconsolidated deposits; and
 - iii) Zones of high permeability or low permeability that might direct and restrict the flow of contaminants.
- f. Based on data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring.
- g. A description of manmade influences that may affect the hydrogeology of the site.

2. Soils

The Permittee shall conduct a program to characterize the soil and rock units above the water table in the vicinity of the contaminant release(s). Trace element geochemistry should be investigated as a means of differentiating units within the tuff.

B. Source Characterization

The Permittee shall collect analytical data to completely characterize the wastes and the areas where wastes have been placed, including: type; quantity; physical form; disposition (containment or nature of deposits); and the facility characteristics affecting release (e.g., facility security, and engineered barriers). This shall include quantification of the following specific characteristics, at each source area:

1. Unit/Disposal Area Characteristics

- a. Location of unit/disposal area;
- b. Type of unit/disposal area;
- c. Design features;
- d. Operating practices (past and present);
- e. Period of operation;
- f. Age of unit/disposal area;
- g. General physical conditions; and
- h. Method used to close the unit/disposal area.

2. Waste Characteristics

- a. Type of waste placed in unit;
- b. Physical and chemical characteristics; and
- c. Migration and dispersal characteristics of the waste.

The Permittee shall document the procedures used in making the above determinations.

C. Contamination Characteristics

The Permittee shall collect analytical data on groundwater, soils, surface water, sediment, and subsurface gas contamination when necessary to characterize contamination from a SWMU. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include time and location of sampling, media sampled, concentrations found, conditions during sampling, and the identity of the individual(s) performing the sampling and analysis. The Permittee shall address the following types of contamination at the facility:

1. Groundwater Contamination

The Permittee shall conduct a Groundwater Investigation to characterize any plumes of contamination at the facility. This investigation shall at a minimum provide the following information:

- a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility;
- b. The horizontal and vertical direction of contamination movement;
- c. The velocity of contaminant movement;
- d. The horizontal and vertical concentration profiles of any Appendix IX constituents and radiochemical constituents in the plume(s);
- e. An evaluation of factors influencing the plume movement; and
- f. An extrapolation of future contaminant movement.

The Permittee shall document the procedures used in making the above determinations (e.g., well design, well construction, geophysics, modeling, etc.).

2. Soil Contamination

The Permittee shall conduct an investigation to characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include the following information:

- a. A description of the vertical and horizontal extent of contamination;
- b. A description of contaminant and soil chemical properties within the contaminant source area and plume migration and transformation;
- c. Specific contaminant concentrations;
- d. The velocity and direction of contaminant movement; and
- e. An extrapolation of future contaminant movement.

The Permittee shall document the procedures used in making the above determinations.

3. Surface Water Contamination

The Permittee shall conduct a surface water investigation to characterize contamination in surface water bodies resulting from contaminant releases at the facility. The investigation shall include the following:

- a. A description of the horizontal and vertical extent of any immiscible or dissolved plumes originating from the facility, and the extent of contamination in the underlying sediments;
- b. The horizontal and vertical direction and velocity of contaminant movement;
- c. An evaluation of the physical, biological, chemical, and radiochemical factors influencing contaminant movement;
- d. An extrapolation of future contaminant movement; and
- e. A description of the chemistry and radiochemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

The Permittee shall document the procedures used in making the above determinations.

4. Air Contamination

The Permittee shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere.

This investigation shall provide the following information:

- a. A description of the horizontal and vertical direction and velocity of contaminant movement;
- b. The rate and amount of the release; and
- c. The chemical, radiochemical, and physical composition of the contaminants released, including horizontal and vertical concentration profiles.

5. Subsurface Gas

The Permittee shall provide information characterizing the nature, rate and extent of releases of reactive gases from the units. Such information shall include, but not be limited to: provisions for monitoring subsurface gases released from the unit; and an assessment of the potential for these releases to have a threat to human health and environment.

The Permittee shall document the procedures used in making the above determination.

D. Potential Receptors

The Permittee shall collect data describing the human populations and environmental systems that are susceptible to contaminant exposure from the facility. Chemical and radiochemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be obtained.

TASK IV: INVESTIGATIVE ANALYSIS

The Permittee shall prepare an analysis and summary of all facility investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support the Corrective Measures Study, if one is required.

The Permittee shall analyze all facility investigation data outlined in Task III and prepare a report on the type and extent of contamination at the facility including sources and migration pathways. The report shall describe the extent of contamination (qualitative/quantitative) in relation to the background levels indicative for the area.

The Permittee shall identify all relevant and applicable standards for the protection of human health and the environment (e.g. National Ambient Air Quality Standards, Federally-approved state water quality standards, Groundwater protection standards, etc.)

TASK V: REPORTS

A. Preliminary and Workplan

The Permittee shall submit to the Administrative Authority the Preliminary Report (Task I) (OTET) and the RCRA Facility Investigation Workplan (Task II) (OTET) as described in the Permit.

B. Progress

Within 60 days of the effective date of this permit, the Permittee shall provide the Administrative Authority with signed, monthly management status reports containing:

1. A description and estimate of the percentage of the RFI (OTET) completed;
2. Summaries of contacts pertaining to corrective action with representatives of the local community, public interest groups or State government during the reporting period;
3. Summaries of problems or potential problems encountered during the reporting period;
4. Actions being taken to rectify problems;
5. Changes in key project personnel during the reporting period; and
6. Projected work for the next reporting period.

C. Draft and Final

The RFI Report (OTET) shall be developed in draft form for the Administrative Authority's review. The RFI Report (OTET) shall be developed in final format incorporating comments received on the Draft RFI Report (OTET).

Two hard copies and one compatible disk copy of all reports, including the Task I report (OTET), Task II workplan (OTET) and both the Draft and Final RFI Reports (Task III-IV) (OTET) shall be provided by the Permittee to the Administrative Authority.

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Facility Submission Summary

A summary of the information reporting requirements contained in the RCRA Facility Investigation Scope of Work (OTET) is presented below:

Facility Submission	Due Date
LANL Installation RI/FS Workplan	180 days*
LANL Task/Site RI/FS Documents**	
Monthly Management Status Reports	Monthly

* Dates are calculated from the effective date of this permit unless otherwise specified.

**Dates will be as specified in the LANL Installation RI/FS Workplan

SCOPE OF WORK FOR A RCRA CORRECTIVE MEASURE STUDY (CMS)
AT
LOS ALAMOS NATIONAL LABORATORY



PURPOSE

The purpose of this Corrective Measure Study (CMS) is to develop and evaluate the corrective action alternative or alternatives and to recommend the corrective measure or measures to be taken at Los Alamos National Laboratory. The Permittee will furnish the personnel, materials, and services necessary to prepare the CMS, except as otherwise specified.

If the Permittee believes that certain requirements of the scope of work are not applicable, the specific requirements shall be identified and the rationale for inapplicability shall be provided. This scope of work should be modified as necessary to require only that information necessary to complete the RCRA CMS.

SCOPE

The Corrective Measure Study consists of four tasks. Those tasks, and the ER Program documents/activities that are equivalent to the CMS documents/activities are listed on the following page. The permittee shall prepare a single installation-wide work plan, which shall be updated annually, and task specific RI/FS documents for each task. The installation-wide work plan shall contain programmatic operating procedures, tabular summaries of the potential release sites, prioritization of the site/tasks, and a work schedule by task (including a current year work plan). The task specific RI/FS documents/activities shall be prepared as tasks are implemented. The detailed outlines for the task specific RI/FS documents shall be provided in the installation-wide work plan.

Scope of CME	ER Program Equivalent	
<p><u>The Corrective Measures Study consists of four tasks:</u></p> <p>Task VI: Identification and Development of the Corrective Measure Alternative or Alternatives</p> <ul style="list-style-type: none"> A. Description of Current Situation B. Establishment of Corrective Action Objectives C. Laboratory and Bench-Scale Study D. Screening of Corrective Measures Technologies E. Identification of the Corrective Measure Alternative or Alternatives 	<p><u>LANL Installation RI/FS Work Plan</u></p>	<p><u>Feasibility Study</u></p> <p>VI. Identification and Development of the Remedial Action Alternative or Alternatives</p> <ul style="list-style-type: none"> A. Description of Current Situation B. Establishment of Remedial Action Objectives C. Bench-Scale and Pilot Studies D. Screening of Remedial Technologies E. Identification of the Remedial Alternative or Alternatives
<p>Task VII: Evaluation of the Corrective Measure Alternative(s)</p> <ul style="list-style-type: none"> A. Technical/Environmental/Human Health/Institutional B. Cost Estimate 	<p>VII.</p>	<p>VII. Evaluation of the Remedial Alternative(s)</p> <ul style="list-style-type: none"> A. Technical/Environmental/Human Health/Institutional B. Cost Estimate
<p>Task VIII: Justification and Recommendation of the Corrective Measure or Measures</p> <ul style="list-style-type: none"> A. Technical B. Human Health C. Environmental 	<p>VIII.</p>	<p>VIII. Justification and Recommendation of the Remedial Measure or Measures</p> <ul style="list-style-type: none"> A. Technical B. Human Health C. Environmental
<p>Task IX: Reports</p> <ul style="list-style-type: none"> A. Progress B. Draft C. Final 	<p>IX. Reports</p> <ul style="list-style-type: none"> A. LANL Installation RI/FS Work Plan B. Annual Update of LANL Installation RI/FS Work Plan C. Draft and Final 	<p>IX. Reports</p> <ul style="list-style-type: none"> A. LANL Task/Site RI/FS Documents and LANL Monthly Management B. Draft C. Final

TASK VI: IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE ACTION ALTERNATIVE OR ALTERNATIVES

Based on the results of the RCRA Facility Investigation (RFI) and consideration of the identified Preliminary Corrective Measure Technologies (Task I) the Permittee shall identify, screen, and develop the alternative(s) for removal, containment, treatment and/or other remediation of the contamination based on the objectives established for the corrective action.

A. Description of Current Situation

The Permittee shall submit an update to the information describing the current situation at the facility and the known nature and extent of the contamination as documented by the RFI report. The Permittee shall provide an update to information presented in Task I of the RFI to the Administrative Authority regarding previous response activities and any interim measures which have or are being implemented at the facility. The Permittee shall also make a facility-specific statement of the purpose for the response, based on the results of the RFI. The statement of purpose should identify the actual or potential exposure pathways that should be addressed by corrective measures.

B. Establishment of Corrective Action Objectives

The Permittee, in conjunction with the Administrative Authority, shall establish site specific objectives for the corrective action. These objectives shall be based on public health and environmental criteria, information gathered during the RCRA Facility Investigation, EPA guidance and the requirements of any applicable Federal statutes. At a minimum, all corrective actions concerning groundwater releases from solid waste management units must be consistent with, and as stringent as, those required under 40 CFR 264.100.

C. Laboratory and Bench-Scale Study

When a new technology is being proposed or similar waste streams have not routinely been treated or disposed using the technology the Permittee shall conduct laboratory and/or bench-scale studies to determine the applicability of a corrective measure technology or technologies to the facility conditions. The Permittee shall analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

The Permittee shall develop a testing plan identifying the type(s) and goal(s) of the study(ies), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of testing, the Permittee shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan.

The Permittee shall prepare a report summarizing the testing program and its results, both positive and negative.

D. Screening of Corrective Measure Technologies

The Permittee shall review the results of the RFI and reassess the technologies specified in Task II and identify any additional technologies which are applicable to the facility. The Permittee shall screen the preliminary corrective measure technologies identified in Task II of the RFI and any supplemental technologies to eliminate those that may prove not feasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that do not achieve the corrective measure objective within a reasonable time period. This screening process focuses on eliminating those technologies which have severe limitations for a given set of waste and site-specific conditions. The screening step may also eliminate technologies based on inherent technology limitations.

Site, waste, and technology characteristics which are used to screen inapplicable technologies are described in more detail below:

1. Site Characteristics

Site data should be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics should be eliminated from further consideration;

2. Waste Characteristics

Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics should be eliminated from consideration. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site); and

3. Technology Limitations

The level of technology development, performance record, and inherent construction, operation and maintenance problems shall be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

E. Identification of the Corrective Measure Alternatives

The Permittee shall develop the corrective measure alternatives based on the corrective measure objectives and analysis of Preliminary Corrective Measure Technologies, as presented in Task I of the RFI as supplemented following the preparation of the RFI report. The Permittee shall rely on engineering practice to determine which of the previously identified technologies appear most suitable for the site. Technologies can be combined to form the overall corrective action alternatives. The alternatives developed should represent a workable number of options that each appear to adequately address all site problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. The Permittee shall document the reasons for excluding technologies, identified in Task I, as supplemented in the development of the alternative.

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- b. The Permittee shall provide information on the reliability of each corrective measure including their operation and maintenance requirements and their demonstrated reliability:
 - i) Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities should be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements shall also be considered; and
 - ii) Demonstrated and expected reliability is a way of measuring the risk and effect of failure. The Permittee should evaluate whether the technologies have been used effectively under analogous conditions; whether the combination of technologies have been used together effectively; whether failure of any one technology has an immediate impact on receptors; and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.
 - c. The Permittee shall describe the implementability of each corrective measure including the relative ease of installation (constructibility) and the total time required to achieve a given level of response:
 - i) Constructibility is determined by conditions both internal and external to the facility conditions and includes such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and location of the facility (i.e., remote location vs. a congested urban area). The Permittee shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities;
 - ii) Time has two components that shall be addressed: the time it takes to implement a corrective measure and the time it takes to actually see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.
 - d. The Permittee shall evaluate each corrective measure alternative with regard to safety. This evaluation shall include threats to the safety of nearby communities and environments as well as those to workers during implementation. Factors to consider include fire, explosion, and exposure to hazardous substances.

2. Environmental

The Permittee shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on facility conditions and pathways of contamination actually addressed by each alternative. The Environmental Assessment for each alternative will include, at a minimum, an evaluation of: the short- and long-term beneficial and adverse effects of the response alternative; any adverse effects on environmentally sensitive areas; and an analysis of measures to mitigate adverse impacts.

3. Human Health

The Permittee shall assess each alternative in terms of the extent which it mitigates short- and long-term potential exposure to any residual contamination and protects human health both during and after implementation of the corrective measure. The assessment will describe the levels and characterizations of contaminants on-site, potential exposure routes, and potentially affected populations. Each alternative will be evaluated to determine the level of exposure to contaminants and the reduction over time. For management of mitigation measures, the relative reduction of impact will be determined by comparing residual levels of each alternative with existing criteria, standards, or regulations acceptable to the Administrative Authority.

4. Institutional

The Permittee shall assess relevant institutional needs for each alternative. Specifically, the effects of Federal, State, and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative.

B. Cost Estimate

The Permittee shall develop an estimate of the cost of each corrective measure alternative (and for each phase or segment of the alternative). The cost estimate shall include capital, and operation and maintenance costs.

1. Capital costs consist of direct (construction) and indirect (nonconstruction and overhead) costs.

- a. Direct capital costs include:

- i) Construction costs: Cost of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measure alternative.
- ii) Equipment costs: Costs of treatment, containment, disposal and/or service equipment necessary to implement the action; these materials remain until the corrective action is completed;

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- iii) Land and site development costs: Expenses associated with purchase of land and development of existing property; and
 - iv) Building and services costs: Costs of process and nonprocess buildings, utility connections, purchased services, and disposal costs.

b. Indirect capital costs include:

- i) Engineering expenses: Costs of administration, design construction supervision, drafting, and testing of corrective measure alternatives;
- ii) Legal fees and license or permit costs: Administrative and technical costs necessary to obtain licenses and permits for installation and operation;
- iii) Start-up and shakedown costs: Costs incurred during corrective measure start-up; and
- iv) Contingency allowances: Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate facility characterization.

2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. The Permittee shall consider the following operation and maintenance cost components:

- a. Operating labor costs: Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operation;
- b. Maintenance materials and labor costs: Costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;
- c. Auxiliary materials and energy: Costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;
- d. Purchased services: Sampling costs, laboratory fees, and professional fees for which the need can be predicted;
- e. Disposal and treatment: Costs of transporting, treating, and disposing of waste materials, such as treatment plant residues generated during operation;
- f. Administrative costs: Costs associated with administration of corrective measure operation and maintenance not included under other categories;

- g. Insurance, taxes, and licensing costs: Costs of such items as liability and sudden accidental insurance; real estate taxes on purchased land or rights-of-way; licensing fees for certain technologies; and permit renewal and reporting costs;
- h. Maintenance reserve and contingency funds: Annual payments into escrow funds to cover (1) costs of anticipated replacement or rebuilding of equipment and (2) any large unanticipated operation and maintenance costs; and
- i. Other costs: Items that do not fit any of the above categories.

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TASK VIII. JUSTIFICATION AND RECOMMENDATION OF THE CORRECTIVE MEASURE OR MEASURES

The Permittee shall justify and recommend a corrective measure alternative using technical, human health, and environmental criteria. This recommendation shall include summary tables which allow the alternative or alternatives to be understood easily. Trade-offs among health risks, environmental effects, and other pertinent factors shall be highlighted. The Administrative Authority will select the corrective measure alternative or alternatives to be implemented based on the results of Tasks VIII and IX. At a minimum, the following criteria will be used to justify the final corrective measure or measures.

A. Technical

1. Performance - corrective measure or measures which are most effective at performing their intended functions and maintaining the performance over extended periods of time will be given preference;
2. Reliability - corrective measure or measures which do not require frequent or complex operation and maintenance activities and have proven effective under waste and facility conditions similar to those anticipated will be given preference;
3. Implementability - corrective measure or measures which can be constructed and operated to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time will be preferred; and
4. Safety - corrective measure or measures which pose the least threat to the safety of nearby residents and environments as well as workers during implementation will be preferred.

B. Human Health

The corrective measure or measures must comply with existing U.S. EPA criteria, standards, or regulations for the protection of human health. Corrective measures which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time are preferred.

C. Environmental

The corrective measure or measures posing the least adverse impact (or greatest improvement) on the environment over the shortest period of time will be favored.

TASK IX: REPORTS

The Permittee shall prepare a Corrective Measure Study Report (OTET) presenting the results of Tasks VII through IX recommending a corrective measure alternative. Two (2) copies and one compatible disk copy of the draft and final reports shall be provided to the the Administrative Authority by the Permittee.

A. Progress

The Permittee shall at a minimum provide the Administrative Authority with signed monthly management status reports containing:

1. A description and estimate of the percentage of the CMS(OTET) completed;
2. Summaries of contacts relevant to corrective action with representatives of the local community, public interest groups or State government during the reporting period;
3. Summaries of problems or potential problems relevant to corrective action encountered during the reporting period;
4. Actions being taken to rectify problems;
5. Changes in key project personnel during the reporting period;
6. Projected work for the next reporting period; and

B. Draft

The Report shall at a minimum include:

1. A summary of the corrective measure or measures and rationale
 - a. Description of the corrective measure or measures and rationale for selection;
 - b. Performance expectations;
 - c. Preliminary design criteria and rationale;
 - d. General operation and maintenance requirements;
 - e. Long-term monitoring requirements

2. Design and Implementation Precautions:

- a. Special technical problems;
- b. Additional engineering data required;
- c. Permits and regulatory requirements;
- d. Access, easements, right-of-way;
- e. Health and safety requirements; and
- f. Community relations activities.

3. Cost Estimates and Schedules:

- a. Capital cost estimate;
- b. Operation and maintenance cost estimate; and
- c. Project schedule (design, construction, operation).

C. Technical Quarterly Progress Reports

The Permittee shall submit quarterly Progress reports which summarize environmental data collected during the previous quarter.

D. Final

The Permittee shall finalize the Corrective Measure Study Report (OTET) incorporating comments received from the Administrative Authority on the Draft Corrective Measure Study Report (OTET).