NEW MEXICO
ENVIRONMENT DEPARTMENT

Water and Waste Management Division

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

March 25, 2008

David Moody, Manager
Carlsbad Field Office
Department of Energy
P.O. Box 3090
Carlsbad, New Mexico 88221-3090

Farok Sharif
Washington TRU Solutions LLC
P.O. Box 2078
Carlsbad, New Mexico 88221-5608

RE: FINAL DETERMINATION, CLASS 2 MODIFICATION REQUESTS
WIPP HAZARDOUS WASTE FACILITY PERMIT
EPA I.D. NUMBER NM4890139088

Dear Dr. Moody and Mr. Sharif:

The New Mexico Environment Department (**NMED**) hereby approves with changes the permit modification requests (**PMRs**) to the WIPP Hazardous Waste Facility Permit as submitted to the Hazardous Waste Bureau in the following documents:

- Request for Class 2 Permit Modification (Electronic Operating Record), Letter Dated 11/20/07, Rec'd 11/26/07
- Request for Class 2 Permit Modification (Hydrogen/Methane Monitoring), Letter Dated 11/20/07, Rec'd 11/26/07

The following items were included in these submittals:

1. Allow the WIPP Operating Record to be maintained in an unalterable, searchable electronic format;
2. Monitor each full panel for hydrogen and methane until final panel closure;
3. Establish action levels for hydrogen and methane;
4. Install substantial barriers and steel bulkheads to isolate a full panel for monitoring purposes;
5. Evaluate the monitoring data to determine an appropriate final closure system;
6. revise the location and frequency of volatile organic compound (**VOC**) monitoring in full panels until final panel closure;

7. Inspect and certify the explosion-isolation walls in Panels 1 and 2 and inspect the bulkheads in Panels 3 through 7 until final panel closure; and
8. Extend the final closure in Panels 1 through 7 to 2016.

These Class 2 PMRs were processed in accordance with the requirements specified in 20.4.1.900 NMAC (incorporating 40 CFR §270.42(b)). They were subject to a sixty (60) day public comment period running from November 21, 2007 through January 21, 2008, during which NMED received written specific comments from a total of five individuals and organizations.

NMED is also incorporating into the revised Permit the following Class 1 modifications:

- Request for Permit Modification Determination of Class (Storage of Records), Letter Dated 7/25/07, Rec'd 7/27/07 (determined to be a Class 1 by NMED in the letter dated 9/13/07)
- Request for Permit Modification Determination of Class (45 Day Public Comment Period), Letter Dated 8/14/07, Rec'd 8/15/07 (determined to be a Class 1 by NMED in the letter dated 9/13/07)
- Notification of Class 1 Permit Modification (WTS General Manager), Letter Dated 9/11/07, Rec'd 9/17/07
- Notification of Class 1 Permit Modification (Many Things), Letter Dated 9/11/07, Rec'd 9/17/07
- Request for Class 1* Permit Modification (Change in Operational Control), Letter Dated 11/19/07, Rec'd 11/26/07
- Notification of Class 1 Permit Modification (Editorial Changes), Letter Dated 2/1/08, Rec'd 2/5/08

Today's approval includes the Class 1* modification requiring prior written agency approval regarding change of operational control. These Class 1 PMRs were processed in accordance with the requirements specified in 20.4.1.900 NMAC (incorporating 40 §270.42(a)).

NMED hereby approves these modifications with changes as noted in Attachment 1. Attachment 2 contains the redline/strikeout pages of the modified permit to help the reader rapidly identify each modification. Language deleted from the permit is ~~stricken out~~. Language added to the permit is highlighted in redline. Specific language changes imposed by NMED are distinguished from language changes proposed in the modification request by yellow highlighting. Also enclosed is a CD-ROM containing the modified files in WordPerfect 12 redline/strikeout format as well as files with markings and comments removed. An electronic version of the modified permit with markings removed will be publicly posted on the NMED WIPP Information Page at <http://www.nmenv.state.nm.us/wipp/download.html>.

For purposes of version control, please note that NMED has established the date of these modified module and attachment pages as March 25, 2008. The effective date of the permit modification approval is your date of receipt of this letter

NMED is providing full response to all public comments under separate cover.

If you have any questions regarding this matter, please contact Steve Zappe of my staff at (505) 476-6051.

Sincerely,

Jon Goldstein
Acting Director
Water and Waste Management Division

JG/soz

Attachment 1 – changes to permit modification request
Attachment 2 – redline/strikeout pages

cc w/o Attachment 2
James Bearzi, NMED HWB
John Kieling, NMED HWB
Steve Zappe, NMED HWB
Laurie King, EPA Region 6
Tom Peake, EPA ORIA

cc w/ Attachments
Chuck Noble, NMED OGC
Connie Walker, Trinity Engineering
File: Red WIPP '08

Attachment 1

Changes to Permit Modification Request

NMED is presenting changes to the permit modification requests (**PMRs**) by Module and Attachment rather than by PMR submittal date to summarize the changes in a more logical manner, because some of the PMRs included multiple modifications for a particular module or attachment that were not presented sequentially. NMED changes are indicated in yellow highlight in Attachment 2 to this letter.

Module I

- Permit Condition I.D.13, "Substantial Barrier" definition – replaced the undefined term "the HWFP" (not used anywhere in the Permit) with a reference to Permit Attachment M2, consistent with current permit construction (November 20, 2007, Item 1).
- Permit Condition I.D.14, "Bulkhead" definition – added reference to Permit Attachment M2, consistent with current permit construction (November 20, 2007, Item 1).
- Permit Condition I.D.15, "Explosion-Isolation Wall" definition – added reference to Permit Attachment M2, consistent with current permit construction. Also hyphenated the term "explosion-isolation wall" here and elsewhere, consistent with use throughout the Permit (November 20, 2007, Item 1).
- "Lower Explosive Limit definition – deleted this definition because it is commonly understood in the general literature and thus does not need to be expressly defined in the Permit (November 20, 2007, Item 1).
- Permit Condition I.D.15, "Filled Panel" definition – equated "panel" to "underground HWDU", added reference to Module IV, consistent with current permit construction. Also broadened the definition of "filled" in response to public comment from SRIC but using language consistent with existing language in Permit Attachment I (November 20, 2007, Item 1).

Module II

- Permit Condition II.K.1 – changed language to "Unless specifically prohibited by ***this*** Permit,…" to be consistent with current permit construction (November 19b, 2007, Item 1.a).

Module IV

- Permit Condition IV.A – added remote-handled waste to the condition for consistency with the rest of the Permit.
- Permit Condition IV.D.3 – added "disposal room" to text of condition for completeness, added reference to description of explosion-isolation wall in Permit Attachment I1, and clarified that disposal room monitoring would be discontinued only in a panel in which an explosion-isolation was installed (November 20, 2007, Item 1).
- Permit Condition IV.F.1.b – changed passive voice to active voice (November 20, 2007, Item 1).
- Permit Condition IV.F.5.a – corrected name from "Program" to "Plan" (November 20, 2007, Item 1).
- Permit Condition IV.F.5.b – edited Permittees' public comment for consistency with similar requirements (e.g., see Permit Condition IV.F.2.b).

- Permit Condition IV.F.5.c – clarified that either hydrogen or methane exceedance of their respective action levels would trigger notification (November 20, 2007, Item 1).
- Permit Condition IV.F.5.d – cleaned up language ambiguities such as "reached or exceeded", that at least one compound must exceed the action level; identified which panels would be subject to remedial action; changed from passive to active voice (November 20, 2007, Item 1).
- Permit Condition IV.F.5.e – rewrote entire condition to clarify two distinct notifications (loss of sampling line, results of evaluation of sampling line loss) (November 20, 2007, Item 1).
- List of Permit Attachments – added reference to Attachment N1 for consistency (November 20, 2007, Item 1).

Permit Attachment A

- Section A-6 – added acronym for Washington Group International in September 16, 2004 entry; changed date of August 2, 2007 entry to August 6, 2007 to reflect actual NMED receipt date, rewrote entry to more accurately reflect content of August 2 correspondence and for consistency; changed date of November 20, 2007 entry to November 26, 2007 to reflect actual NMED receipt date, rearranged and edited entry to more accurately reflect changed of operational control (November 19a, 2007, Item 1.a).

Permit Attachment B

- Section B-4a(7) – minor punctuation correction (July 20, 2007, Item 1).

Permit Attachment B2

- Section B2-1a – clarified the definition of *n* (September 11, 2007, Item 7.a).
- Section B2-1b – edited sentence regarding situation if there are fewer than the minimum or required number of containers to be consistent with modifications associated with explanation after Equation B2-3 (September 11, 2007, Item 7.a).
- Section B2-2b – replace "drums" with "containers" for consistency, include reference to EPA's SW-846 (September 11, 2007, Item 7.a).

Permit Attachment I

- Introduction – struck the word "when" that was missed when the Attachment was revised on October 16, 2006 (311/RH PMR).
- Section I-1d(1) – add specific day of the month for completion of final closure (November 20, 2007, Item 1).
- Table I-1, Notes 5 and 6 – add specific day of the month for completion of final closure (November 20, 2007, Item 1).

Permit Attachment M1

- Section M1-1d(2) – edit a missing change to waste shaft conveyance nomenclature (September 11, 2007, Item 9.a).

Permit Attachment M2

- Section M2-1 – edit a missing change to waste shaft conveyance nomenclature (September 11, 2007, Item 9.a).
- Section M2-2a(1) – edit a missing change to waste shaft conveyance nomenclature (September 11, 2007, Item 9.a).
- Section M2-2b – edit a missing change to waste shaft conveyance nomenclature (September 11, 2007, Item 9.a).

Permit Attachment N

- Section N-3a(3) – clarified that disposal room VOC monitoring would be discontinued only in a panel in which an explosion-isolation was installed (November 20, 2007, Item 1).
- Section N-3d(2) – edited and relocated language from new Section N-6 regarding disposal room VOC sampling schedule in filled panels (November 20, 2007, Item 1).
- Section N-5 – edit for consistency to remove redundant statement, "of this Attachment", when the section number was provided (November 20, 2007, Item 1).
- Section N-6 – clarified VOC monitoring was for disposal rooms, not repository monitoring (November 20, 2007, Item 1).

Permit Attachment N1 – (all November 20, 2007, Item 1)

- Section N1-1 – deleted the phrase "in filled rooms" when referencing where hydrogen and methane are generated, as it implied monitoring would commence when a room was filled.
- Section N1-2 – added definition of "filled panel" consistent with Module I; clarified that monitoring would commence after installation of substantial barriers, bulkheads, and additional monitoring locations in filled panels; clarified where the "existing VOC monitoring lines" were specified in the Permit; clarified the term "back" and that the additional locations are in the access drifts.
- Section N1-3 – clarified and made consistent the criteria for monthly and weekly monitoring.
- Section N1-4 – added reference to EPA Compendium Method TO-15.
- Section N1-5a – added reference to EPA Compendium Method TO-15.
- Section N1-8 – deleted "the" when referring to NMED to be consistent with Permit construction.
- Section N1-9 – added a list of references.

Attachment 2
Redline/Strikeout Pages

I.D.11. Waste Characterization

"Waste characterization" or "characterization" means the activities performed by the waste generator/storage sites to obtain information used by the Permittees to satisfy the general waste analysis requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.13(a)). Characterization occurs before waste containers have been certified for disposal at WIPP.

I.D.12. Waste Confirmation

"Waste confirmation" or "confirmation" means the activities performed by the Permittees to satisfy the requirements specified in Section 310 of Pub. L. 108-447. Confirmation occurs after waste containers have been certified for disposal at WIPP.

I.D.13. Substantial Barrier

"Substantial barrier" means salt or other non-combustible material installed between the waste face and the bulkhead to protect the waste from events such as ground movement or vehicle impacts. The substantial barrier incorporates the chain link and brattice cloth room closure specified in ~~the HWFP~~ Permit Attachment M2.

I.D.14. Bulkhead

"Bulkhead" means a steel structure, with flexible flashing, that is used to block ventilation as specified in Permit Attachment M2.

I.D.15. Explosion-Isolation Wall

"Explosion-isolation wall" means the 12-foot wall intended as an explosion isolation device that is part of the approved panel-closure system specified in Permit Attachment I1.

~~I.D.16. Lower Explosive Limit~~

~~"Lower Explosive Limit" means the lowest concentration in air at which a gas will ignite and explode. The terms lower explosive limit and lower flammability limit are used interchangeably in fire science literature.~~

I.D.17. Filled Panel

"Filled panel" means an Underground Hazardous Waste Disposal Unit specified in Permit Module IV that will no longer receive ~~TRU mixed~~ waste for emplacement.

implement the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.56).

II.J. MANIFEST SYSTEM

The Permittees shall comply with the manifest requirements of 20.4.1.500 NMAC (incorporating 40 CFR §§264.71 and 264.72). The Permittees shall not accept for storage or disposal any mixed waste from an off-site source without an accompanying manifest.

II.K. RECORDKEEPING AND REPORTING

In addition to the recordkeeping and reporting requirements specified elsewhere in this Permit, the Permittees shall comply with the following conditions:

II.K.1. Operating Record

The Permittees shall maintain a written operating record at the facility, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.73(a)). The written operating record shall include all information required under 20.4.1.500 NMAC (incorporating 40 CFR §264.73(b)) subject to the limitations on the storage of classified information as discussed in Permit Attachment B-1c. Unless specifically prohibited by this Permit, an electronic record that cannot be altered by the user and capable of producing a paper copy shall be deemed to be a written record. The Permittees shall maintain the operating record until closure of the facility.

II.K.2. Biennial Report

The Permittees shall submit to the Secretary a biennial report, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.75).

II.L. GENERAL CLOSURE REQUIREMENTS

II.L.1. Performance Standard

The Permittees shall close the facility as specified in the Closure Plan, Permit Attachment I (Closure Plan), and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.111).

II.L.2. Amendment to Closure Plan

The Permittees shall amend the Closure Plan, Permit Attachment I, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.112(c)), whenever necessary.

submit a report to the Secretary by October 27 of each year summarizing CH Bay Surge Storage Area usage.

Table III.A.1 - WHB Unit

Description	Area	Maximum Capacity	Container Equivalent
CH Bay Storage Area	26,151 ft^2 (2,430 m^2)	4,800 ft^3 (135.9 m^3)	~~17~~ 13 loaded facility pallets and 4 CH Packages at the TRUDOCKS
CH Bay Surge Storage Area	included in CH Bay Storage Area	1,600 ft^3 (45.3 m^3)	5 loaded facility pallets
Derived Waste Storage Area	included in CH Bay Storage Area	66.3 ft^3 (1.88 m^3)	1 Standard Waste Box
Total for CH Waste	26,151 ft^2 (2,430 m^2)	**6,466.3 ft^3 183.1 m^3**	
RH Bay	12,552 ft^2 (1,166 m^2)	156 ft^3 (4.4 m^3)	2 loaded casks and 1 drum of derived waste
Cask Unloading Room	382 ft^2 (36 m^2)	74 ft^3 (2.1 m^3)	1 loaded cask
Hot Cell	1,841 ft^2 (171 m^2)	94.9 ft^3 (2.7 m^3)	~~10~~ 12 drums and 1 drum of derived waste
Transfer Cell	1,003 ft^2 (93 m^2)	31.4 ft^3 (0.89 m^3)	1 canister
Facility Cask Loading Room	1,625 ft^2 (151 m^2)	31.4 ft^3 (0.89 m^3)	1 canister
Total for RH Waste	**17,403 ft^2 (1,617 m^2)**	**387.7 ft^3 (11.0 m^3)**	
Facility Total	**43,554 ft^2 (4,047,m^2)**	**6,854 ft^3 (194.1 m^3)**	**–**

III.A.1.e. Storage on pallets - the Permittees shall store TRU mixed waste containers unloaded from the Contact-Handled Packages (**TRUPACT-II or HalfPACT** shipping containers) on pallets in the WHB Unit, as described in Permit Attachment M1, Section M1-1c(1).

IV. MODULE IV - GEOLOGIC REPOSITORY DISPOSAL

IV.A. DESIGNATED DISPOSAL UNITS

This Module authorizes the management and disposal of contact-handled (**CH**) and remote-handled (**RH**) transuranic (**TRU**) mixed waste containers in the Underground Hazardous Waste Disposal Units (**Underground HWDUs**) identified herein. Specific facility and process information for the management and disposal of CH and RH TRU mixed waste in the Underground HWDUs is incorporated in Permit Attachment M2 (Geologic Repository).

IV.A.1. Underground Hazardous Waste Disposal Units

The Underground HWDUs are located at the WIPP facility approximately 2150 feet (665 meters) below the ground surface within the Salado formation. An Underground HWDU is a single excavated panel, consisting of seven rooms and two access drifts, designated for disposal of TRU mixed waste containers.

The Permittees may dispose TRU mixed waste in the Underground HWDUs, provided the Permittees comply with the following conditions:

IV.A.1.a. Disposal containers - the Permittees shall dispose TRU mixed waste in containers specified in Permit Condition IV.C.1.

IV.A.1.b. Disposal locations and quantities - the Permittees shall dispose TRU mixed waste containers in seven (7) Underground HWDUs, as specified in Table IV.A.1 below and depicted in Permit Attachment M2, Figure M2-1. The Permittees may dispose quantities of TRU mixed waste containers in these locations not to exceed the maximum capacities specified in Table IV.A.1 below. The Permittees may increase these capacities subject to the following conditions:

i. The Permittees may submit a Class 1 permit modification requiring prior approval of the Secretary in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.42(a)) to increase the CH TRU mixed waste capacity by 35,300 ft^3 (1,000 m^3) or less, and the RH TRU mixed waste capacities in Panels 5 and 6 to a maximum of 22,950 ft^3 (650 m^3).

At least fifteen (15) calendar days before submittal to NMED, the Permittees shall post a link to the Class 1 permit modification on the WIPP Home Page and inform those on the e-mail notification list.

ii. Notwithstanding Permit Condition IV.A.1.b.i, any Underground HWDU CH TRU waste capacity may be increased by up to 25 percent of the total maximum capacity in Table IV.A.1 by submitting a Class 2 permit modification request in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.42(b)).

Table IV.A.1 - Underground HWDUs

Description[1]	Waste Type	Maximum Capacity[2]	Container Equivalent	Final Waste Volume
Panel 1	CH TRU	636,000ft^3 (18,000 m^3)		371,000 ft^3 (10,500 m^3)
Panel 2	CH TRU	636,000 ft^3 (18,000 m^3)		634,500 ft^3 (17,998 m^3)
Panel 3	CH TRU	662,150 ft^3 (18,750 m^3)		569,164 ft^3 (17,092 m^3)
Panel 4	CH TRU	662,150 ft^3 (18,750 m^3)		
	RH TRU	12,570 ft^3 (356 m^3)	400 RH TRU Canisters	
Panel 5	CH TRU	662,150 ft^3 (18,750 m^3)		
	RH TRU	15,720 ft^3 (445 m^3)	500 RH TRU Canisters	
Panel 6	CH TRU	662,150 ft^3 (18,750 m^3)		
	RH TRU	18,860 ft^3 (534 m^3)	600 RH TRU Canisters	
Panel 7	CH TRU	662,150 ft^3 (18,750 m^3)		
	RH TRU	22,950 ft^3 (650 m^3)	730 RH TRU Canisters	
Total	**CH TRU**	**4,582,750 ft^3 (129,750 m^3)**		
	RH TRU	**70,100 ft^3 (1,985 m^3)**	**2230 RH TRU Canisters**	

[1] The area of each panel is approximately 124,150 ft^2 (11,533 m^2).
2 "Maximum Capacity" is the maximum volume of TRU mixed waste that may be emplaced in each panel. The maximum repository capacity of “6.2 million cubic feet of transuranic waste” is specified in the WIPP Land Withdrawal Act (Pub. L. 102-579, as amended)

Table IV.D.1 - VOC Room-Based Limits	
Compound	**VOC Room-Based Concentration Limit (PPMV)**
Carbon Tetrachloride	9625
Chlorobenzene	13000
Chloroform	9930
1,1-Dichloroethene	5490
1,2-Dichloroethane	2400
Methylene Chloride	100000
1,1,2,2-Tetrachloroethane	2960
Toluene	11000
1,1,1-Trichloroethane	33700

There are no maximum concentration limits for other VOCs.

IV.D.2. Determination of VOC Room-Based Limits

The Permittees shall confirm the VOC concentration and emission rate limits identified in Permit Condition IV.D.1 using the VOC Monitoring Plan specified in Permit Attachment N (Volatile Organic Compound Monitoring Plan). The Permittees shall conduct monitoring of VOCs as specified in Permit Conditions IV.F.2 and IV.F.3.

IV.D.3. Ongoing Disposal Room VOC Monitoring in Panels 3 Through 7

The Permittees shall continue disposal room VOC monitoring in Room 1 of Panels 3 through 7 after completion of waste emplacement until final panel closure unless the explosion-isolation wall specified in Permit Attachment I1 is installed in ~~any of these~~ the panels~~s~~.

IV.E. DESIGN, CONSTRUCTION, AND OPERATION REQUIREMENTS

The Permittees shall design, construct, and operate the Underground HWDUs as specified by the following conditions and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601):

IV.E.1. Repository Design

The Permittees shall construct each Underground HWDU in conformance with the requirements specified in Permit Attachment M2 and Permit Attachment M3 (Drawing Number 51-W-214-W, "Underground Facilities Typical Disposal Panel").

area intake ventilation drift or the exhaust ventilation drift to access the mining and construction areas.

IV.E.3.b. Ventilation - the Permittees shall maintain a minimum running annual average mine ventilation exhaust rate of 260,000 standard ft^3/min and a minimum active room ventilation rate of 35,000 standard ft^3/min when workers are present in the room, as specified in Permit Attachment M2, Section M2-2a(3), "Subsurface Structures (Underground Ventilation System Description)" and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601(c)).

IV.E.3.c. Ventilation barriers - the Permittees shall construct ventilation barricades in active Underground HWDUs to prevent the flow of mine ventilation air through full disposal rooms, as specified in Permit Attachment M2, Section M2-2a(3), "Subsurface Structures (Underground Ventilation System Description)" and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601(c)).

IV.F. MAINTENANCE AND MONITORING REQUIREMENTS

The Permittees shall maintain and monitor the Underground HWDUs as specified by the following conditions and as required by 20.4.1.500 NMAC (incorporating 40 CFR §§264.601 and 264.602):

IV.F.1. Geomechanical Monitoring

IV.F.1.a. Implementation of geomechanical monitoring program - the Permittees shall implement a geomechanical monitoring program in each Underground HWDU as specified in Permit Attachment M2, Section M2-5b(2), "Geomechanical Monitoring" and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.602).

IV.F.1.b. Reporting requirements - the Permittees shall submit to the Secretary an annual report, beginning twelve (12) months after issuance of this Permit, evaluating the geomechanical monitoring program and shall include geomechanical data collected from each Underground HWDU during the previous year, as specified in Permit Attachment M2, Section M2-5b(2), "Geomechanical Monitoring", and shall also include a map showing the current status of HWDU mining. The Permittees shall also submit~~ted~~ at that time ~~will be~~ an annual certification by a registered professional engineer certifying the stability of any explosion-isolation walls. The Permittees ~~will~~ shall also notify the e-mail

notification list within seven (7) calendar days of submittal of this certification.

IV.F.1.c. Notification of adverse conditions - when evaluation of the geomechanical monitoring system data identifies a trend towards unstable conditions which requires a decision whether to terminate waste disposal activities in any Underground HWDU, the Permittees shall provide the Secretary with the same report provided to the WIPP Operations Manager within ~~five (5) working~~ seven (7) calendar days of its issuance, as specified in Permit Attachment M2, Section M2-5b(2)(a), "Description of the Geomechanical Monitoring System".

IV.F.2. Repository Volatile Organic Compound Monitoring

IV.F.2.a. Implementation of repository VOC monitoring - the Permittees shall implement repository VOC monitoring as specified in Permit Attachment N (Volatile Organic Compound Monitoring Plan) and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.602 and §264.601(c)). The Permittees shall implement repository VOC monitoring within thirty (30) calendar days of issuance of this Permit until the certified closure of all Underground HWDUs.

IV.F.2.b. Reporting requirements - the Permittees shall report to the Secretary semi-annually, beginning twelve (12) months after issuance of this Permit, the data and analysis of the VOC Monitoring Plan.

IV.F.2.c. Notification requirements - the Permittees shall notify the Secretary in writing, within ~~five (5) days~~ seven (7) calendar of obtaining validated analytical results, whenever the concentration of any VOC specified in Table IV.D.1 exceeds the concentration of concern specified in Table IV.F.2.c below.

The Permittees shall notify the Secretary in writing, within ~~five (5) working~~ seven (7) calendar days of obtaining validated analytical results, whenever the running annual average concentration (calculated after each sampling event) for any VOC specified in Table IV.D.1 exceeds the concentration of concern specified in Table IV.F.2.c below.

IV.F.3. Disposal Room Volatile Organic Compound Monitoring

IV.F.3.a. Implementation of disposal room VOC monitoring - the Permittees shall implement disposal room VOC monitoring as specified in Permit Attachment N and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.602 and §264.601(c)).

IV.F.3.b. Notification requirements - the Permittees shall notify the Secretary in writing, within ~~five (5) working~~ seven (7) calendar days of obtaining validated analytical results, whenever the concentration of any VOC specified in Table IV.D.1 in any closed room in an active panel or in the immediately adjacent closed room exceeds the action levels specified in Table IV.F.3.b below.

Table IV.F.3.b - Action Levels for Disposal Room Monitoring

Compound	50% Action Level for VOC Constituents of Concern in Any Closed Room, ppmv	95% Action Level for VOC Constituents of Concern in Active Open or Immediately Adjacent Closed Room, ppmv
Carbon Tetrachloride	4,813	9,145
Chlorobenzene	6,500	12,350
Chloroform	4,965	9,433
1,1-Dichloroethene	2,745	5,215
1,2-Dichloroethane	1,200	2,280
Methylene Chloride	50,000	95,000
1,1,2,2-Tetrachloroethane	1,480	2,812
Toluene	5,500	10,450
1,1,1-Trichloroethane	16,850	32,015

IV.F.3.c. Remedial action - upon receiving validated analytical results that indicate one or more of the VOCs specified in Table IV.D.1 in any of the closed rooms in an active panel has reached the “50% Action Level” in Table IV.F.3.b, the sampling frequency for such closed rooms will increase to once per week. The once per week sampling will continue either until the concentrations in the closed room(s) fall below the “50% Action Level” in

Table IV.F.3.b, or until closure of Room 1 of the panel, whichever occurs first. If one or more of the VOCs in Table IV.D.1 in the active open room or immediately adjacent closed room reaches the "95% Action Level" in Table IV.F.3.b, another sample will be taken to confirm the existence of such a condition. If the second sample confirms that one or more of VOCs in the immediately adjacent closed room have reached the "95% Action Level" in Table IV.F.3.b, the active open room will be abandoned, ventilation barriers will be installed as specified in Permit Condition IV.E.3.c, waste emplacement will proceed in the next open room, and monitoring of the subject closed room will continue at a frequency of once per week until commencement of panel closure.

IV.F.4. Mine Ventilation Rate Monitoring

IV.F.4.a. Implementation of Mine Ventilation Rate Monitoring Plan - the Permittees shall implement the Mine Ventilation Rate Monitoring Plan specified in Permit Attachment Q (Mine Ventilation Rate Monitoring Plan) and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.602 and §264.601(c)). The Permittees shall implement this plan within thirty (30) calendar days of approval by the Secretary until the certified closure of all Underground HWDUs.

IV.F.4.b. Reporting requirements - the Permittees shall report to the Secretary annually, beginning twelve (12) months after issuance of this Permit, the results of the data and analysis of the Mine Ventilation Rate Monitoring Plan.

IV.F.4.c. Notification requirements - the Permittees shall calculate the running annual average mine ventilation exhaust rate on a monthly basis. In addition, the Permittees shall evaluate compliance with the minimum active room ventilation rate specified in Permit Condition IV.E.3.b on a monthly basis. Whenever the evaluation of the mine ventilation monitoring program data identifies that the ventilation rates specified in Permit Condition IV.E.3.b have not been achieved, the Permittees shall notify the Secretary in writing within ~~five (5) working~~ seven (7) calendar days.

IV.F.5. Hydrogen and Methane Monitoring Program

IV.F.5.a. Implementation of hydrogen and methane monitoring - the Permittees shall implement the Hydrogen and Methane Monitoring ~~Program~~ Plan specified in Permit Attachment N1.

IV.F.5.b. Reporting requirements - the Permittees shall report to the Secretary semi-annually, beginning twelve (12) months after issuance of this Permit, ~~validated~~ the data and analysis of ~~from~~ the Hydrogen and Methane Monitoring Plan.

IV.F.5.c. Notification requirements - the Permittees shall notify the Secretary in writing, within seven (7) calendar days of obtaining validated analytical results, whenever the concentration of hydrogen or methane in a filled panel exceeds the action levels specified in Table IV.F.5.c below.

The Permittees will also notify the e-mail notification list, within seven (7) calendar days of obtaining validated analytical results, if the concentration of hydrogen or methane in a filled panel exceeds these action levels ~~are exceeded~~.

Table IV.F.5.c - Action Levels for Hydrogen and Methane Monitoring

Compound	Action Level 1	Action Level 2
Hydrogen	4,000 ppm	8,000 ppm
Methane	5,000 ppm	10,000 ppm

IV.F.5.d. Remedial action - upon receiving validated analytical results that indicate ~~that~~ at least one compound exceeded "Action Level 1" in Table IV.F.5.c, ~~has been reached or exceeded~~ the sampling frequency in that filled panel will ~~be~~ increase~~d~~ to once per week~~ly~~. Upon receiving validated analytical results that indicate ~~that~~ at least one compound exceeded "Action Level 2" in Table IV.F.5.c ~~has been reached or exceeded~~ in two consecutive weekly samples, the Permittees shall install in that panel the explosion-isolation wall specified in Permit Attachment I1 ~~will be installed~~.

IV.F.5.e. Sampling line loss - ~~any loss of sampling lines will be evaluated as described in Section N1-5b,~~

~~and notifications submitted to the Secretary and to the e-mail notification list within seven (7) calendar days of the discovery of loss of sampling line(s)~~ the Permittees shall notify the Secretary in writing and the e-mail notification list within seven (7) calendar days of the discovery of loss of sampling line(s). The Permittees shall evaluate any loss of sampling lines as described in Permit Attachment N1, Section N1-5b, "Sample Tubing", and shall notify the Secretary in writing and the e-mail notification list within seven (7) calendar days the results of such evaluation.

IV.G. INSPECTION SCHEDULES AND PROCEDURES

The Permittees shall inspect the Underground HWDUs at least weekly, as specified in Permit Attachment D (Inspection Schedule/Procedures, Tables D-1 and D-1a), and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.15). The Permittees shall perform these inspections to detect malfunctions, signs of deterioration, operator errors, discharges, or any other factors which have caused or may cause a release of hazardous wastes or hazardous waste constituents to the environment or which may compromise the ability of any Underground HWDU to comply with the environmental performance standards in 20.4.1.500 NMAC (incorporating 40 CFR §264.601).

IV.H. RECORDKEEPING

IV.H.1. Underground HWDU Location Map

The Permittees shall maintain, in the operating record, a map containing the exact location and dimensions of each Underground HWDU with respect to permanently surveyed benchmarks.

IV.H.2. Disposal Waste Type and Location

The Permittees shall maintain, in the operating record, a record identifying the types and quantities of TRU mixed waste in each Underground HWDU and the disposal location of each container or container assembly (e.g., a 7-pack of standard 55-gallons drums) within each Underground HWDU, using the following fields from the WWIS data dictionary:

1. Panel Number
2. Room Number or Drift Number
3. Row Number (for CH TRU mixed waste) or Borehole Number (for RH TRU mixed waste)
4. Column Number (for CH TRU mixed waste)
5. Column Height (for CH TRU mixed waste)
6. Container Type Code
7. Container Identification Number
8. Manifest Document Number

PERMIT ATTACHMENTS

Permit Attachment D (as modified from WIPP RCRA Part B Permit Application, "Procedures to Prevent Hazards" - Chapter F).

Permit Attachment G (as modified from the WIPP RCRA Part B Permit Application, "Facility Description" - Chapter B).

Permit Attachment I (as modified from WIPP RCRA Part B Permit Application, "Closure Plans, Post-Closure Plans, and Financial Requirements" - Chapter I).

Permit Attachment I1 (as modified from WIPP RCRA Part B Permit Application, "Detailed Design Report for an Operational Phase Panel-Closure System" - Appendix I1).

Permit Attachment I2 (as modified from WIPP RCRA Part B Permit Application, "Waste Isolation Pilot Plant Shaft Sealing system Compliance Submittal Design Report" - Appendix I2, as replaced by Sandia Report SAND 96-1326).

Permit Attachment M1 (as modified from WIPP RCRA Part B Permit Application, "Facility and Process Information" - Chapter D).

Permit Attachment M2 (as modified from WIPP RCRA Part B Permit Application, "Facility and Process Information" - Chapter D).

Permit Attachment M3 (as modified from WIPP RCRA Part B Permit Application, "Underground Facilities Typical Disposal Panel" - Drawing Number 51-W-214-W).

Permit Attachment N (as modified from WIPP RCRA Part B Permit Application, "Confirmatory Volatile Organic Compound Monitoring Plan" - Appendix D20).

Permit Attachment N1 (“Hydrogen and Methane Monitoring Plan”)

Permit Attachment Q ("Mine Ventilation Rate Monitoring Plan").

VII.O.2. After the Permittees submit the RFI Report and Summary, the Secretary shall either approve or disapprove them in writing.

If the Secretary approves the RFI Report and Summary, the Permittees shall mail the approved Summary to all individuals on the facility mailing list established pursuant to 20.4.1.1103 NMAC (referencing 40 CFR §124.10(c)(1)(ix)), within fifteen (15) calendar days of receipt of approval.

If the Secretary determines the RFI Report and Summary do not fully meet the objectives stated in Permit Condition VII.U, the Secretary may disapprove the RFI Report and Summary. If the Secretary disapproves the Report, the Secretary shall notify the Permittees in writing of the Report's deficiencies and require submittal of a revised RFI Report and Summary within thirty (30) calendar days of such notification, or the Secretary shall modify the RFI Report before approval. Once approved, the Summary shall be mailed to all individuals on the facility mailing list as specified above, unless the Permittees take exception to the conditions of the approved RFI Report. If the Permittees take exception to any portion of the RFI Report approved by the Secretary, written notification of the exception(s) will be sent to the Secretary in accordance with dispute resolution provisions of Permit Condition VII.F. The time periods set forth in this paragraph may be extended for good cause upon the Permittees' written request and the Secretary's written approval.

VII.O.3. Action levels, as discussed in Permit Condition VII.G, shall be used by the Permittees to determine the need for further corrective action under this Module. Action levels are not the same as cleanup levels, although in some cases a final cleanup level may equal the action level.

VII.P. DETERMINATION OF NO FURTHER ACTION

VII.P.1. Based on the results of the RFI and/or other relevant information, the Permittees may petition the Secretary for a Class III Permit modification under 20.4.1.900 NMAC (incorporating 40 CFR §270.42(c)) to terminate the RFI/CMS process for a specific SWMU. This petition shall contain information demonstrating that there are no releases of hazardous waste or hazardous constituents to the soil from a particular SWMU at the facility that pose threats to human health and/or the environment, as well as additional information required in 20.4.1.900 NMAC (incorporating 40 CFR §270.42(c)).

If, based upon review of the Permittees' request for a Permit modification, the results of the RFI, and other information, including comments received during the ~~forty-five (45) calendar day~~ public comment period required for Class III Permit modifications, the Secretary determines that releases or suspected releases which were investigated either are non-existent or do not pose a threat to human health and/or the environment, the Secretary may grant the requested modification.

TABLE 2A
SWMUS NOT REQUIRING AN RFI

SWMU NUMBER	NAME
TRU Mixed Waste Management Unit (3 SWMUs)	
SWMU 013a	Waste Handling Building Unit
SWMU 013b	Parking Area Unit
SWMU 013c	Underground HWDU - Panel 1
SWMU 013d	Underground HWDU - Panel 2
SWMU 013e	Underground HWDU - Panel 3
SWMU 013f	Underground HWDU - Panel 4

ATTACHMENT A

GENERAL FACILITY DESCRIPTION AND PROCESS INFORMATION

A-1 Facility Description

Abstract

NAME OF FACILITY:	Waste Isolation Pilot Plant
OWNER and CO-OPERATOR:	U.S. Department of Energy P.O. Box 3090 Carlsbad, NM 88221
CO-OPERATOR:	Washington TRU Solutions LLC P.O. Box 2078 Carlsbad, NM 88221
RESPONSIBLE OFFICIALS:	David. C. Moody, Manager DOE/Carlsbad Field Office ~~Richard D. Raaz,~~ Farok Sharif, General Manager Washington TRU Solutions LLC
FACILITY MAILING ADDRESS:	U.S. Department of Energy P.O. Box 3090 Carlsbad, NM 88221
FACILITY LOCATION:	30 miles east of Carlsbad on the Jal Highway, in Eddy County.
TELEPHONE NUMBER:	505/234-7300
U.S. EPA I.D. NUMBER:	NM4890139088
GEOGRAPHIC LOCATION:	32º 22' 30" N 103º 47' 30" W
DATE OPERATIONS BEGAN:	November 26, 1999

	Company LLC (**WGES**), Waste Isolation Division (**WID**). However, this notification did not constitute the required permit modification under 20.4.1.900 NMAC (incorporating 40 CFR §270.40) necessary to reflect the transfer of the permit to a new operator.
December 15, 2000	DOE announced that it had awarded a five-year contract for management and operation of WIPP to Westinghouse TRU Solutions LLC, a limited liability company owned jointly by WGES LLC and Roy F. Weston, Inc. The announcement further stated that, following a brief transition period, the new contractor would assume MOC responsibilities on February 1, 2001. This transaction constituted a change of operational control under 20.4.1.900 NMAC (incorporating 40 CFR §270.40) requiring a Class 1 permit modification with prior written approval of NMED.
February 5, 2001	NMED received a Class 1 permit modification in a letter dated February 2, 2001, which notified NMED of an organizational name change of the MOC from Westinghouse Government Environmental Services Company LLC Waste Isolation Division to Westinghouse TRU Solutions LLC. However, this notification did not constitute the required permit modification under 20.4.1.900 NMAC (incorporating 40 CFR §270.40) necessary to reflect the transfer of the permit to a new operator.
December 31, 2002	NMED received a Class 1 permit modification in a letter dated December 27, 2002, which changed the name of the MOC from Westinghouse TRU Solutions LLC to Washington TRU Solutions LLC. Again, this notification did not constitute the required permit modification under 20.4.1.900 NMAC (incorporating 40 CFR §270.40) necessary to reflect the transfer of the permit to a new operator.
February 28, 2003	NMED received a Class 1 permit modification requiring prior agency approval in a letter dated February 28, 2003, to satisfy the requirements specified in 20.4.1.900 NMAC (incorporating 40 CFR §270.40) to reflect the transfer of the permit to a new operator.
September 16, 2004	NMED received a Class 1 permit modification requiring prior agency approval in a letter dated September 16, 2004, describing a change of ownership of Washington TRU Solutions LLC (**WTS**). WTS is owned jointly by WGES, managing member, and Weston Solutions, Inc. WGES had been owned jointly by Washington Group International, Inc. (**WGI**), and BNFL Nuclear Services, Inc.. However, ~~Washington Group International~~ WGI has acquired BNFL's prior interest in the former Westinghouse government services businesses, which includes BNFL's prior interest in WGES.
August 6, 2007	NMED received notification in a letter dated August 2, 2007 of the pending acquisition of WGI by URS Corporation at an unknown future date. This acquisition would be related to operational control, because WGI is the sole owner of WGES, managing member of the joint venture,

	along with Weston Solutions, Inc., that owns WTS, the WIPP MOC. This notification was submitted to assure compliance with 20.4.1.900 NMAC (incorporating 40 CFR §270.40(b)).
November 26, 2007	NMED received a Class 1* permit modification requiring prior agency approval in a letter dated November 19, 2007, describing a change of ownership of WTS. On November 15, 2007, WGI was acquired by URS Corporation. WTS is owned jointly by WGES, managing member, and Weston Solutions, Inc. WGES, formerly owned by WGI, is now owned by URS Corporation.

B-4a(7) Records Management

Records related to waste characterization activities performed by the generator/storage sites will be maintained in the testing, sampling, or analytical facility files or generator/storage site project files, or~~,~~ at the WIPP Records Archive facility. Permittee approved laboratories will forward testing, sampling, and analytical records along with BDRs, to the generator/storage site project office for inclusion in the generator/storage site's project files and to the Permittees for inclusion in the WIPP facility operating record. Raw data obtained by testing, sampling, and analyzing TRU mixed waste in support of this WAP will be identifiable, legible, and provide documentary evidence of quality. TRU mixed waste characterization records submitted to the Permittees shall be maintained in the WIPP facility operating record and be available for inspection by NMED.

Records inventory and disposition schedule (**RIDS**) or an equivalent system shall be prepared and approved by generator/storage site personnel. All records relevant to an enforcement action under this Permit, regardless of disposition, shall be maintained at the generator/storage site until NMED determines they are no longer needed for enforcement action, and then dispositioned as specified in the approved RIDS. All waste characterization data and related QA/QC records ~~in the generator/storage site project files~~ for TRU mixed waste to be shipped to the WIPP facility are designated as either Lifetime Records or Non-Permanent Records.

Records that are designated as Lifetime Records shall be maintained for the life of the waste characterization program at a participating generator/storage site plus six years~~, then offered to the Permittees~~ or transferred for permanent archival storage to the WIPP Records Archive facility ~~of information of these records in the appropriate form, or transferred to the appropriate Federal Records Center (**FRC**)~~.

Waste characterization records designated as Non-Permanent Records shall be maintained for ten years from the date of (record) generation at the participating generator/storage site~~,~~ or at the WIPP Records Archive facility and then dispositioned according to their approved RIDS. If a generator/storage site ceases to operate, all records shall be transferred before closeout to the Permittees for management at the WIPP Records Archive facility. Table B-6 is a listing of records designated as Lifetime Records and Non-Permanent Records. Classified information will not be transferred to WIPP. Notations will be provided to the Permittees indicating the absence of classified information. The approved generator/storage site RIDS will identify appropriate disposition of classified information. Nothing in this Permit is intended to, nor should it be interpreted to, require the disclosure of any U.S. Department of Energy classified information to persons without appropriate clearance to view such information.

B-5 Permittee Level Waste Screening and Verification of TRU Mixed Waste

Permittee waste screening is a two-phased process. Phase I will occur prior to configuring shipments of TRU mixed waste. Phase II will occur after configuration of shipments of TRU mixed waste but before it is disposed at the WIPP facility. Figure B-3 presents Phase I and a portion of Phase II of the TRU mixed waste screening process. Permit Attachment B7 presents the Permittees' TRU mixed waste confirmation portion of Phase II activities.

- Whether the containers are in good condition

The Permittees will verify that the containers (as identified by their container ID numbers) are the containers for which accepted data already exists in the WWIS. A check will be performed by the Permittees comparing the data on the WWIS Shipment Summary Report for the shipment to the actual shipping papers (including the EPA Hazardous Waste Manifest). This check also verifies that the containers included in the shipment are those for which approved shipping data already exist in the WWIS Transportation Data Module (Table B-7). For standard waste boxes (**SWBs**) and ten drum overpacks (**TDOPs**), this check will include comparing the barcode on the container with the container number on the shipping papers and the data on the WWIS Shipment Summary Report. For 7-pack assemblies, one of the seven container barcodes will be read by the barcode reader and compared to the assembly information for this container on the WWIS Shipment Summary Report. This will automatically identify the remaining six containers in the assembly. This process enables the Permittees to identify all of the containers in the assembly with minimum radiological exposure. If all of the container IDs and the information on the shipping papers agree with the WWIS Shipment Summary Report, and the shipment was subject to waste confirmation by the Permittees prior to shipment to WIPP as specified in Permit Attachment B7, the containers will be approved for storage and disposal at the WIPP facility.

B-6 Permittees' Waste Shipment Screening QA/QC

Waste shipment screening QA/QC ensures that TRU mixed waste received is that which has been approved for shipment during the Phase I and Phase II screening. This is accomplished by maintaining QA/QC control of the waste shipment screening process. The screening process will be controlled by administrative processes which will generate records documenting waste receipt that will become part of the waste receipt record. The waste receipt record documents that container identifications correspond to shipping information and approved TRU mixed waste streams. The Permittees will extend QA/QC practices to the management of all records associated with waste shipment screening determinations.

B-7 Records Management and Reporting

As part of the WIPP facility's operating record, data and documents associated with waste characterization and waste confirmation are managed in accordance with standard records management practices.

All waste characterization data for each TRU mixed waste container transmitted to WIPP shall be maintained by the Permittees for the active life of the WIPP facility plus two years. The active life of the WIPP facility is defined as the period from the initial receipt of TRU mixed waste at the facility until NMED receives certification of final closure of the facility. After their active life, the records shall be retired to the WIPP Records Archive facility ~~FRC~~ and maintained for 30 years. These records will then be offered to the National Archives. However, this disposition requirement does not preclude the inclusion of these records in the permanent marker system or other requirements for institutional control.

TABLE B-1
SUMMARY OF HAZARDOUS WASTE CHARACTERIZATION REQUIREMENTS FOR TRANSURANIC MIXED WASTE [a]

Parameter	Techniques and Procedure
Physical Waste Form Summary Category Names S3000 Homogeneous Solid S4000 Soil/Gravel S5000 Debris Wastes	**Waste Inspection Procedures** Radiography Visual Examination (Permit Attachment B1-3)
Headspace Gases **Volatile Organic Compounds** Benzene Bromoform Carbon tetrachloride Chlorobenzene Chloroform 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethylene (cis)-1,2-Dichloroethylene (trans)-1,2-Dichloroethylene Ethyl benzene Ethyl ether ~~Formaldehyde~~[b] ~~Hydrazine~~[c] Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane Trichloroethylene 1,1,2-Trichloro-1,2,2-trifluoroethane Xylenes Alcohols and Ketones Acetone Butanol Methanol Methyl ethyl ketone Methyl isobutyl ketone	**Gas Analysis** [f] Gas Chromatography /Mass Spectroscopy (GC/MS), EPA TO-14 or modified SW-846 8240/8260 (Permit Attachment B3) GC/Flame Ionization Detector (FID), for alcohols and ketones, SW-846 8015 (Permit Attachment B3) Fourier Transform Infrared Spectroscopy (FTIRS), SW-846

To perform radiography, the waste container is scanned while the operator views the television screen. A video and audio recording is made of the waste container scan and is maintained as a non-permanent record. A radiography data form is also used to document the Waste Matrix Code~~,~~ to ensure that the waste container contains no ignitable, corrosive, or reactive waste by documenting the absence of liquids in excess of TSDF-WAC limits or compressed gases, and verify that the physical form of the waste is consistent with the waste stream description documented on the WSPF. Containers whose contents prevent full examination of the remaining contents shall be subject to visual examination unless the site certifies that visual examination would provide no additional relevant information for that container based on the acceptable knowledge information for the waste stream. Such certification shall be documented in the generator/storage site's record.

For containers which contain classified shapes and undergo radiography, the radiography video and audio recording will be considered classified. The radiography data forms will not be considered classified.

The radiography system involves qualitative and semiquantitative evaluations of visual displays. Operator training and experience are the most important considerations for ensuring quality controls in regard to the operation of the radiography system and for interpretation and disposition of radiography results. Only trained personnel shall be allowed to operate radiography equipment.

Standardized training requirements for radiography operators shall be based upon existing industry standard training requirements.

The Permittees shall require each site to develop a training program that provides radiography operators with both formal and on-the-job (**OJT**) training. Radiography operators shall be instructed in the specific waste generating practices, typical packaging configurations, and associated waste material parameters expected to be found in each Waste Matrix Code at the site. The OJT and apprenticeship shall be conducted by an experienced, qualified radiography operator prior to qualification of the training candidate. The training programs will be site-specific due to differences in equipment, waste configurations, and the level of waste characterization efforts. For example, certain sites use digital radiography equipment, which is more sensitive than real-time radiography equipment. In addition, the particular physical forms and packaging configurations at each site will vary; therefore, radiography operators shall be trained on the types of waste that are generated, stored, and/or characterized at that particular site.

Although the Permittees shall require each site to develop its own training program, all of the radiography QC requirements specified in this WAP shall be incorporated into the training programs and radiography operations. In this way data quality and comparability will not be affected.

Radiography training programs will be the subject of the Permittees' Audit and Surveillance Program (Permit Attachment B6).

A training drum with internal container of various sizes shall be scanned biannually by each operator. The audio and video media shall then be reviewed by a supervisor to ensure that

TABLE B1-3
SUMMARY OF SAMPLING QUALITY CONTROL SAMPLE ACCEPTANCE CRITERIA

QC Sample	Acceptance Criteria	Corrective Action[a]
Field blanks	VOC amounts ~~<~~ ≤ 3 x MDLs in Table B3-2 for GC/MS and GC/FID; < PRQLs in Table B3-2 for FTIRS	Nonconformance if any VOC amount ~~≥~~ > 3 x MDLs in Table B3-2 for GC/MS and GC/FID; ≥ PRQLs in Table B3-2 for FTIRS
Equipment blanks	VOC amounts ~~<~~ ≤ 3 x MDLs in Table B3-2 of for GC/MS and GC/FID; < PRQLs in Table B3-2 for FTIRS	Nonconformance if any analyte amount ~~≥~~ > 3 x MDLs in Table B3-2 for GC/MS and GC/FID; ≥ PRQLs in Table B3-2 for FTIRS
Field reference standards or on-line control sample	70 - 130 %R	Nonconformance if %R < 70 or > 130
Field duplicates or on-line duplicate	RPD ≤ 25	Nonconformance if RPD > 25

[a] Corrective action is only required if the final reported QC sample results do not meet the acceptance criteria.

MDL = Method detection limit
%R = Percent recovery
RPD = Relative percent difference

and RCRA-toxicity determination of a waste stream, then, excludes contaminants associated with F-numbers that have been assigned to the waste stream.

The sampling and analysis strategy is illustrated in Figure B2-1. Preliminary estimates of the mean concentration and variance of each RCRA regulated contaminant in the waste will be used to determine the number of waste containers to select for sampling and analysis. Preliminary estimates will be based on a minimum of five samples selected randomly from the waste stream. If the entire waste stream is not accessible for sampling then a minimum of five preliminary samples will be selected randomly from the accessible population. As the rest of the waste stream is retrieved or generated, additional selected containers will be sampled as provided below and the analytical results will be reported to the Permittees. Samples collected to establish preliminary estimates that are selected, sampled, and analyzed using a Permittee approved laboratory in accordance with applicable provisions of the WAP may be used as part of the required number of samples to be collected. The applicability of the preliminary estimates to the waste stream to be sampled shall be justified and documented. The preliminary estimates will be determined in accordance with the following equations:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad \text{(B2-1)}$$

$$s^2 = \frac{1}{n-1}\sum_{i=1}^{n} (x_i - \bar{x})^2 \qquad \text{(B2-2)}$$

Where:

$\bar{x}$ = the calculated mean.
s^2 = the calculated concentration variance.
n = the number of samples analyzed.
x_i = the concentration determined in the *ith* sample.
i = an index from 1 to n.

Based upon the preliminary estimates of ~~x~~ $\bar{x}$ and s^2 for each chemical contaminant of concern, estimate the appropriate minimum number of samples (*n)* to be collected for each contaminant using the following formula~~s~~ from SW-846 (EPA 1996):

$$n = \frac{t^2_{\alpha,n_0-1}s^2}{(RT-\bar{x})^2} \qquad \text{(B2-3)}$$

Where:

n_0 = the initial number of samples used to calculate the preliminary ~~sample~~ estimates.
n = the calculated minimum number ~~required~~ of samples ~~in the preliminary estimate~~ to be collected.
~~t^2~~ $t_{\alpha,n-1}$ = the 90th percentile for ~~a~~ the t distribution with n_0-1 degrees of freedom.
RT = the Regulatory Threshold of the contaminant (TC limit for toxicity characteristic wastes, PRQL for listed wastes)

The number of samples to be collected will be based upon the largest n calculated for each of the contaminants of concern. The actual number of samples collected shall be adjusted as necessary to ensure that an adequate number of samples are collected to allow for acceptable levels of completeness.

~~All~~ Non-integer results of calculations for the required sample size should be rounded up to the ~~nearest~~ next integer. A minimum of five containers shall be sampled and analyzed in each waste stream. If there are fewer containers than the minimum or required number of ~~containers~~ samples in a waste stream, one or more randomly selected containers shall be sampled more than once to obtain the number of needed samples of the waste. Otherwise any one container may be selected for sampling only once.

The calculated total number of required waste containers will then be randomly sampled and analyzed using a Permittee approved laboratory. Waste container samples from the preliminary mean and variance estimates may be counted as part of the total number of calculated required samples if and only if:

- There is documented evidence that the waste containers for the preliminary estimate samples were selected in the same random manner as is chosen for the required samples.
- There is documented evidence that the method of sample collection in the preliminary estimate samples were identical to the methodology to be employed for the required samples.
- There is documented evidence that the method of sample analysis in the preliminary estimate samples were identical to the analytical methodology employed for the required samples.
- There is documented evidence that the validation of the sample analyses in the preliminary estimate samples were comparable to the validation employed for the required samples. In addition, the validated samples results shall indicate that all sample results were valid according to the analytical methodology.

If only a portion of a waste stream is accessible for sampling (e.g., the remainder of the waste stream will be recovered from storage at the generator/storage site, or only a portion of the waste stream has been repackaged, treated, or generated), the calculated number of samples will be randomly selected from the accessible portion of the waste stream. A minimum of five randomly selected samples will be obtained and analyzed from the accessible portion of the

waste stream. The Permittees may approve the WSPF and authorize the generator/storage site to begin shipping the waste stream to WIPP once the analytical data for the randomly selected samples from the accessible portion of the waste stream have been obtained.

The generator/storage site will also randomly select the calculated number of sample locations from the waste stream as a whole. A minimum of five randomly selected sample locations will be selected from the waste stream as a whole. As those randomly selected locations (e.g., buried or newly generated waste containers) become accessible for sampling, samples will be obtained and analyzed.

For those waste streams where the population of the waste stream as a whole is indeterminate (e.g., continually generated waste streams from ongoing processes) or to facilitate waste processing, the generator/storage site may divide the waste stream into lots. In this case, a minimum of five randomly selected sample locations will be selected from within each subsequent lot. As those randomly selected locations (e.g., buried or newly generated waste containers) become accessible, samples will be obtained and analyzed. As with sampling from the waste stream as a whole, the generator/storage site may ship waste from the lot being generated or retrieved prior to completing sampling and analysis of the lot.

The generator/storage site will use the data to update the UCL_{90} values for the waste stream as described in Section B2-2a and assign EPA hazardous waste numbers as appropriate. The generator/storage sites will submit the analytical data from subsequent sampling to the Permittees for inclusion in the WIPP facility operating record upon completion of project level data validation in Permit Attachment B3, Section B3-10b. If changes to EPA hazardous waste numbers are required as a result of subsequent sampling, the generator/storage site will notify the Permittees and shipments of the affected waste stream shall be suspended until the Permittees approve a revised WSPF for the affected waste stream.

Upon collection and analysis of the preliminary samples, or at any time after the preliminary samples have been analyzed, the generator/storage site may presumptively assign hazardous waste numbers to a waste stream even if the calculated number of required samples is greater than the preliminary number of samples collected. For waste streams with calculated upper confidence limits below the regulatory threshold, the site shall collect the required number of samples if the site intends to establish that the constituent is below the regulatory threshold.

B2-1b Statistical Selection of Containers for Headspace Gas Analysis

Headspace gas sampling of a waste stream may be done on a randomly selected portion of containers in the waste stream. The minimum number of containers, *n*, that must be sampled is determined by taking an initial VOC sample from ten randomly selected containers. These samples are analyzed for all the target analytes analytes using a Permittee approved laboratory. The standard deviation, *s,* is calculated for each of the nine VOCs in Module IV, Table IV.D.1. The value of *n* is determined as the largest number of samples (not to exceed the number of containers in the waste stream or waste stream lot) calculated using the following equation:

$$n_{voc_i} = \frac{t^2_{\alpha,n-1} s^2_{e_{voc_i}}}{E^2_{voc_i}} \qquad \text{(B2-4)}$$

Where:

n_{voci} = the number of samples needed to representatively sample the waste stream for the VOC_i from Table IV.D.1
$t_{\alpha,n-1}$ = the 90th percentile of the *t* distribution with *n*-1 degrees of freedom
s_{evoci} = the estimated standard deviation, based on the initial ~~ten~~ *n* samples, for VOC_i from Table IV.D.1
E_{voci} = the allowable error determined as 1 percent of the limiting concentration for VOC_i from Table IV.D.1

~~All~~ Non-integer results of calculations for the required sample size should be rounded up to the next integer. A minimum of ten containers shall be sampled and analyzed in each waste stream. If there are fewer containers than the minimum or required number of ~~containers~~ samples in a waste stream, then each container should be sampled once.

The calculated total number of required waste containers will then be randomly sampled and analyzed. Waste container samples from the preliminary mean and variance estimates may be counted as part of the total number of calculated required samples if and only if:

- There is documented evidence that the waste containers for the preliminary estimate samples were selected in the same random manner as is chosen for the required samples.
- There is documented evidence that the method of sample collection in the preliminary estimate samples were identical to the methodology to be employed for the required samples.
- There is documented evidence that the method of sample analysis in the preliminary estimate samples were identical to the analytical methodology employed for the required samples.
- There is documented evidence that the validation of the sample analyses in the preliminary estimate samples were comparable to the validation employed for the required samples. In addition, the validated samples results shall indicate that all sample results were valid according to the analytical methodology.

The mean and standard deviation calculated after sampling *n* containers can be used to calculate a UCL_{90} for each of the headspace gas VOCs using the methodology presented in Section B2-2b.

If only a portion of a waste stream is accessible for sampling (e.g., the remainder of the waste stream will be recovered from storage at the generator/storage site or only a portion of the waste stream has been repackaged or treated), the calculated number of samples will be randomly selected from the accessible portion of the waste stream. A minimum of ten randomly selected samples will be obtained and analyzed from the accessible portion of the waste stream. The Permittees may approve the WSPF and authorize the generator/storage site to begin shipping the waste stream to WIPP once the analytical data for the randomly selected samples from the accessible portion of the waste stream has been obtained.

The generator/storage site will also randomly select the calculated number of sample locations from the waste stream as a whole. A minimum of ten randomly selected sample locations will be selected from the waste stream as a whole. As those randomly selected locations (e.g., buried or newly generated waste containers) become accessible for sampling, samples will be obtained and analyzed.

For those waste streams where the population of the waste stream as a whole is indeterminate (e.g., continually generated waste streams from ongoing processes) or to facilitate waste processing, the generator/storage site may divide the waste stream into lots. In this case, a minimum of ten randomly selected containers will be selected from within each subsequent lot. As those randomly selected containers (e.g., buried or newly generated waste containers) become accessible, samples will be obtained and analyzed. As with sampling from the waste stream as a whole, the generator/storage site may ship waste from the lot being generated or retrieved prior to completing sampling and analysis of the lot.

The generator/storage site will use the data to update the UCL_{90} values for the waste stream as described in Section B2-2b and assign EPA hazardous waste numbers as appropriate. The generator/storage sites will submit the analytical data from subsequent sampling to the Permittees for inclusion in the WIPP facility operating record upon completion of project level data validation in Permit Attachment B3, Section B3-10b. If changes to EPA hazardous waste numbers are required as a result of subsequent sampling, the generator/storage site will notify the Permittees, and shipments of the affected waste stream shall be suspended until the Permittees approve a revised WSPF for the affected waste stream.

Upon collection and analysis of the preliminary samples, or at any time after the preliminary samples have been analyzed, the generator/storage site may presumptively assign hazardous waste numbers to a waste stream even if the calculated number of required samples is greater than the preliminary number of samples collected. For waste streams with calculated upper confidence limits below the regulatory threshold, the site shall collect the required number of samples if the site intends to establish that the constituent is below the regulatory threshold.

B2-2 Upper Confidence Limits for Statistical Sampling

B2-2a Upper Confidence Limit for Statistical Solid Sampling

Upon completion of the required sampling, final mean and variance estimates and the UCL_{90} for the mean concentration for each contaminant shall be determined. The observed sample n^* shall be checked against the preliminary estimate for the number of samples (n) to be collected before proceeding, where n* is:

$$n^* = \frac{t^2_{\alpha,n-1} s^2}{(RT - \bar{x})^2} \qquad \text{(B2-5)}$$

and the right-side terms in the equation are as defined in Section B2-1a.

If the observed sample *n** estimate results in greater than 20 percent or more required samples than were originally calculated, then the additional samples required to fulfill the revised sample estimate shall be collected and analyzed. The determination of *n** is an iterative process that follows the collection and analysis of any additional samples and continues until the difference between *n** and the previous sample size determination is less than 20 percent.

Once sufficient sampling and analysis has occurred, the waste characterization will proceed. The assessment will be made ~~with~~ at the 90 percent confidence level. The UCL_{90} for the mean concentration of each contaminant will be calculated using ~~in accordance with~~ the following equation from OSWER 9285.6-10 (EPA 2002):

$$UCL_{90} = \bar{x} + \frac{t_{\alpha,n-1}s}{\sqrt{n}} \qquad \text{(B2-6)}$$

~~When composite headspace gas sample results are used, the mean, standard deviation and t-statistic are based on the number of composite samples analyzed, rather than the number of drums sampled.~~ If the UCL_{90} for the mean concentration is less than the regulatory threshold limit, the waste stream ~~will not~~ is not required to be assigned the hazardous waste number for ~~this~~ the associated contaminant. If the UCL_{90} is greater than or equal to the regulatory threshold limit, the waste stream will be assigned the hazardous waste number for ~~this~~ the associated contaminant.

B2-2b Upper Confidence Limit for Statistical Headspace Gas Sampling

A UCL_{90} concentration for each of the headspace gas VOCs must be calculated from the sample data collected. The observed sample *n** shall be checked against the estimate for the number of samples (n) to be collected before proceeding, where n* is:

$$n^* = \frac{t^2_{\alpha,n-1}s^2}{E^2} \qquad \text{(B2-7)}$$

where *E* is as defined in Section B2-1b and the remaining right-side terms in the equation are defined in Section B2-1a. When composite headspace gas sample results are used, the mean, standard deviation, and t-statistic are based on the number of composite samples analyzed, rather than the number of ~~drums~~ containers sampled.

If the observed sample *n** estimate results in greater than 20 percent or more required samples than were originally calculated, then the additional samples required to fulfill the revised sample estimate shall be collected and analyzed. The determination of *n** is an iterative process that follows the collection and analysis of any additional samples and continues until the difference between *n** and the previous sample size determination is less than 20 percent. The~~n, the~~ UCL_{90} is then calculated using equation B2-6. In this case, UCL_{90} is the 90 percent upper confidence limit for the mean VOC concentration, $\bar{x}$ is the calculated sample mean VOC concentration and *s* is the calculated sample standard deviation. The value of $t_{(\alpha,n-1)}$ is ~~taken from~~ found in Table 9-2 of Chapter 9 of SW-846 (EPA, 1996).

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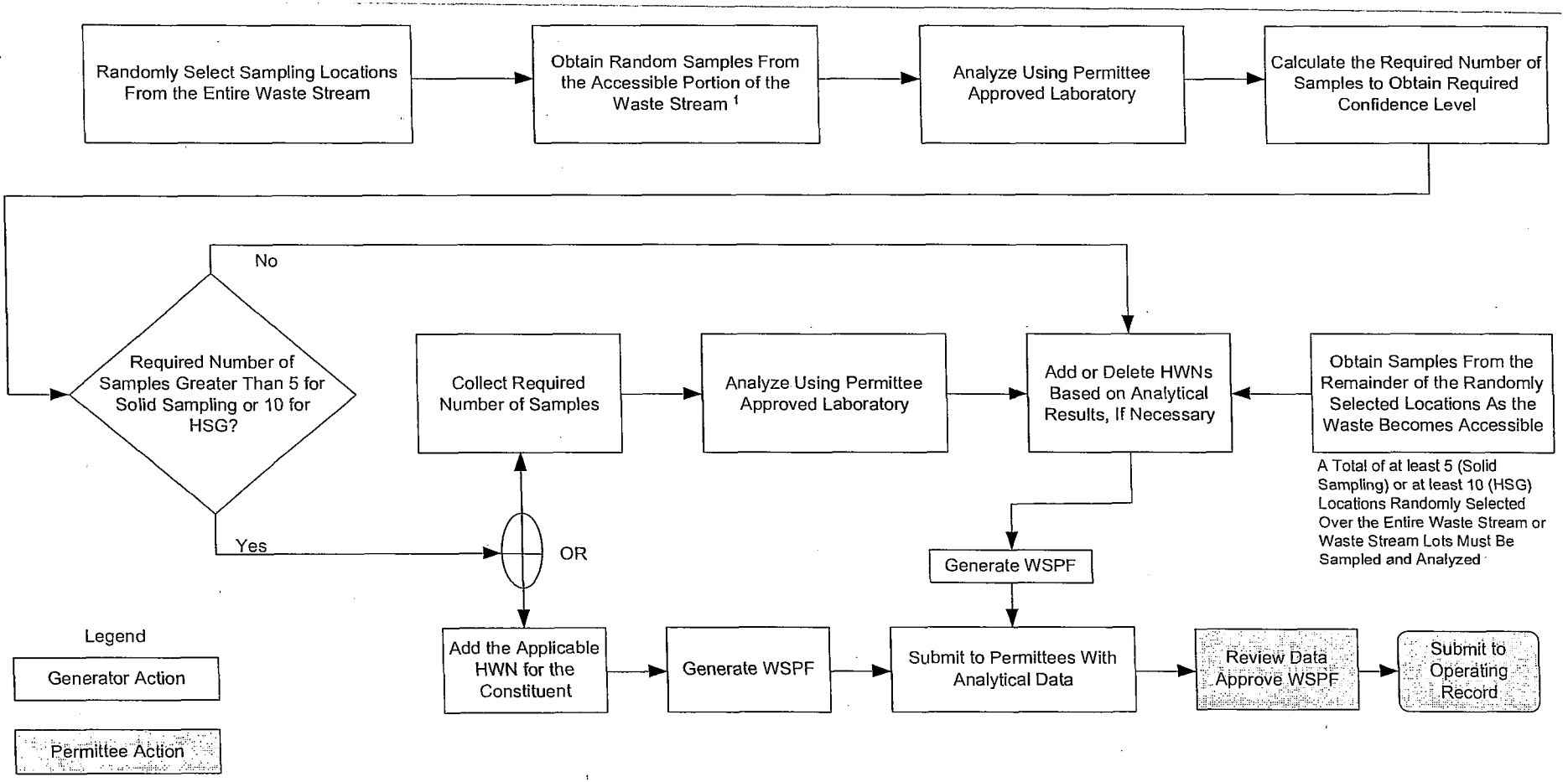


[1] Samples Are Obtained From the First Five Accessible Random Locations for Solid Sampling and the First Ten Accessible Random Locations for Headspace Gas Sampling

Figure B2-1
Approach for Solid and Headspace Gas Sampling and Analysis to Obtain Additional Waste Characterization Information

$$\%R = \frac{S - U}{C_{sc}} \times 100 \quad \text{(B3-6)}$$

where S is the measured concentration in the spiked aliquot, U is the measured concentration in the unspiked aliquot, and C_{sc} is the actual concentration of the spike added.

Method Detection Limit

The method detection limit (**MDL**) is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The MDL for all quantitative measurements (except for those using Fourier Transform Infrared Spectroscopy [**FTIRS**]) is defined as follows:

$$MDL = t_{(n-1,1-\alpha=.99)} \times s \quad \text{(B3-7)}$$

where ~~T~~$t_{(n-1,1-\alpha=.99)}$ is the t-distribution value ~~appropriate~~ corresponding to a 99 percent confidence level ~~and a standard deviation estimate~~ with n-1 degrees of freedom, n is the number of observations, and s is the standard deviation of replicate measurements.

For headspace-gas analysis using FTIRS, MDL is defined as follows:

$$MDL = 3s \quad \text{(B3-8)}$$

where s is the standard deviation. Initially, a minimum of seven samples spiked at a level of three to five times the estimated MDL and analyzed on non-consecutive days must be used to establish the MDLs. MDLs should be updated using the results of the laboratory control sample or on-line control samples.

Completeness

Completeness is a measure of the amount of valid data obtained from the overall measurement system compared to the amount of data collected and submitted for analysis. Completeness must be expressed as the number of samples analyzed with valid results as a percent of the total number of samples submitted for analysis. Completeness, expressed as the percent complete (**%C**), is calculated as follows:

$$\%C = \frac{V}{n} \times 100 \quad \text{(B3-9)}$$

where V is the number of valid sampling or analytical results obtained and n is the number of samples submitted for analysis.

TABLE B3-11
TESTING BATCH DATA REPORT CONTENTS

Required Information	Radiography	Visual Examination	Comment
Batch Data Report Date	X	X	
Batch number	X	X	
Waste container number	X	X	
Waste stream name and/or number	O	O	
Waste Matrix Code	X	X	Summary Category Group included in waste matrix code
Implementing procedure (specific version used)	X	X	If procedure cited contains more than one method, the method used must also be cited. Can use revision number, date, or other means to track specific version used.
Container type	O	O	Drums, Standard Waste Box, Ten Drum Overpack, etc.
Video media reference	X	X	Reference to Video media applicable to each container. For visual examination of newly generated waste, video media not required if two trained operators review the contents of the waste container to ensure correct reporting.
Imaging check	O		
Camera check		O	
Audio check	O	O	
QC documentation	X	X	
Verification that the physical form matches the waste stream description and Waste Matrix Code.	X	X	Summary Category Group included in waste matrix code
Comments	X	X	
Reference to or copy of associated NCRs, if any	X	X	Copies of associated NCRs must be available.
Verify absence of prohibited items	X	X	

Required Information	Radiography	Visual Examination	Comment
Operator signature and date of test	X	X	Signatures of both operators required for Visual Verification of Acceptable Knowledge
Data review checklists	X	X	All data review checklists will be identified

LEGEND:

X - Required in batch data report.
O - Information must be documented and traceable; inclusion in batch data report is optional.

	WAP Requirement[1]	Procedure Documented		Example of Implementation/ Objective Evidence, as applicable		Comment (e.g., any change in procedure since last audit, etc.)
		Location	Adequate? Y/N (Why?)	Item Reviewed	Adequate? Y/N	
68	Are procedures in place to ensure that the generator/storage site maintains records that are designated as Lifetime Records for the life of the waste characterization program plus six years, or that the records have been transferred for permanent archival storage to the WIPP Records Archive facility ~~and then offer those records to the Permittees or transferred to the appropriate Federal Records Center (FRC)~~? Lifetime Records include: • Field sampling data forms, • Field and laboratory COC forms, • Test facility and laboratory Batch Data Reports, • Waste Stream Characterization Package, • Sampling plans, • Data reduction, validation, and reporting documentation, • Acceptable knowledge documentation, • WSPF and Characterization Information Summary (Section B-4a(7), Table B-6)					

	WAP Requirement[1]	Procedure Documented		Example of Implementation/ Objective Evidence, as applicable		Comment (e.g., any change in procedure since last audit, etc.)
		Location	Adequate? Y/N (Why?)	Item Reviewed	Adequate? Y/N	
69	Are procedures in place to ensure that the generator/storage site maintains records that are designated as Non-Permanent Records for ten years from the date of record generation, and then dispositioned according per the approved RIDS or transferred to the WIPP Records Archive facility? Non-Permanent Records include: • Nonconformance documentation, • Variance documentation, • Assessment documentation, • Gas canister tags, • Methods performance documentation, • PDP documentation, • Sampling equipment certifications, • Calculations and related software documentation, • Training/qualification documentation, • QAPjP documentation (all revisions), • Calibration documentation, • Analytical raw data, • Procurement documentation, • QA procedures (all revisions), • Technical implementing procedures (all revisions), and • Audio/video recording (radiography, visual, etc.). (Section B-4a(7), Table B-6)					
70	Are procedures in place to ensure that the generator/storage site has raw data that is identifiable and legible, and provides documentary evidence of quality? (Section B-4a(7))					
71	Are procedures in place to ensure that if the generator/storage site ceases to operate, that all records be transferred before closeout? (Section B-4a(7))					

Visual Examination (VE) Checklist

	WAP Requirement[1]	Procedure Documented		Example of Implementation/ Objective Evidence, as applicable		Comment (e.g., any change in procedure since last audit, etc.)
		Location	Adequate? Y/N (Why)	Item Reviewed	Adequate? Y/N	
	TRAINING					
296	Is there documentation which shows that a standardized training program for visual examination personnel has been developed? Is it specific to the site and include the various waste configurations generated/stored at the site? (Section B1-4)					
297	Is there documentation which shows that the visual inspectors receive training on the specific waste generating processes, typical packaging configurations, and waste material parameters expected to be found in each waste matrix code at the site? (Section B1-4)					
298	Are the visual examination personnel requalified once every two years? (Section B1-4)					
	VISUAL EXAMINATION EXPERT REQUIREMENTS					
300	Does documentation ensure that the site has designated a visual examination expert? Is the visual examination expert familiar with the waste generating processes that have taken place at the site? Is the visual examination expert familiar with all of the types of waste being characterized at that site? (Section B1-4)					
301	Does documentation ensure that the visual examination expert shall be responsible for the overall t direction and implementation of the visual examination aspects of the program? Does the site's QAPjP specify the selection, qualification, and training requirements of the visual examination expert? (B1-4)					
	VISUAL EXAMINATION PROCEDURES					
304	Do procedures indicate that all visual examination activities are recorded on audio/videotape or alternatively, by using a second operator to provide additional verification by reviewing the contents of the waste container to ensure correct reporting? (Section B1-4)					
313	Do site procedures ensure that when liquids are found, the non-transparent container holding the liquid will be assumed to be filled with liquid and this volume will be added to the total liquid in the payload container? The payload container would then be rejected and/or repackaged to exclude the container if it is over the TSDF-WAC limits. (Section B-3c)					

contents match the waste stream description on the WSPF and the waste contains no liquids in excess of TSDF-WAC limits or compressed gases. The Permittees will document their review of generator/storage site VE data on Permittee VE data forms. Generator/storage site VE forms or packaging logs subject to review by the Permittees shall meet the following minimum requirements:

- At least two generator site personnel shall approve the data forms or packaging logs attesting to the contents of the waste container.
- The data forms or packaging logs shall contain an inventory of waste items in sufficient detail that a trained Permittee VE expert can identify the associated waste material parameters.
- The waste container identification number shall be recorded on the data forms or packaging logs.

VE video media of containers which contain classified shapes shall be considered classified information. VE data forms will not be considered classified information.

B7-1c(1) Visual Examination Training

The Permittees' VE operators performing waste confirmation shall be trained in accordance with the requirements of Permit Attachment H1.

B7-1c(2) Visual Examination Oversight

The Permittees shall designate at least one VE expert. The VE expert shall be familiar with the processes that ~~generated the~~ were used to generate the waste streams being confirmed using VE. The VE expert shall be responsible for the overall direction and implementation of the Permittees' VE program. The Permittees shall specify the selection, qualification, and training requirements of the visual examination expert in an SOP.

B7-1d Quality Assurance Objectives (**QAO**s) for Radiography and Visual Examination

The QAOs the Permittees must meet for radiography and visual examination are detailed in this section. If the QAOs described below are not met, then corrective action as specified in Permit Attachment B3, Section B3-13 shall be taken.

B7-1d(1) Radiography QAOs

The QAOs for radiography are detailed in this section. If the QAOs described below are not met, then corrective action shall be taken.

Data to meet these objectives must be obtained from a video and audio recorded scan provided by trained radiography operators. Results must also be recorded on a radiography data form. The precision, accuracy, representativeness, completeness, and comparability objectives for radiography data are presented below.

TABLE D-1
INSPECTION SCHEDULE/PROCEDURES

	System/Equipment Name	Responsible Organization	Inspection [a] Frequency and Job Title of Personnel Normally Making Inspection	Procedure Number and Inspection Criteria
1 2	Uninterruptible Power Supply (Central UPS)	Facility Operations	Daily See List 3	WP 04-ED1542 Inspecting for Mechanical Operability[m] and Deterioration[b] with no malfunction alarms. Results of this inspection are logged in accordance with WP 04-AD3008.
3	TDOP Upender	Waste Handling	Preoperational See List 8	WP 05-WH1010 Inspecting for Mechanical Operability[m] and Deterioration[b]
4	Vehicle Siren	Emergency Services	Weekly See List 11	Functional Test included with inspection of the Ambulances, Fire Trucks, and Rescue Trucks
5	Ventilation Exhaust	Maintenance Operations	Quarterly See List 10	IC041098 Check for Deterioration[b] and Calibration of Mine Ventilation Rate Monitoring Equipment
6	Waste Handling Cranes	Waste Handling	Preoperational See List 8	WP 05-WH1407 Inspecting for Mechanical Operability[m], Deterioration[b], and Leaks/Spills
7	Waste Hoist	Underground Operations	Preoperational See List 1b and c	WP 04-HO1003 Inspecting for Deterioration[b], Safety Equipment, Communication Systems, and Mechanical Operability[m], Leaks/Spills, in accordance with MSHA requirements
8	Water Tank Level	Facility Operations	Daily See List 3	SDD-WD00 Inspecting for Deterioration[b], and water levels. Results of this inspection are logged in accordance with WP 04-AD3008.
9	Push-Pull Attachment	Waste Handling	Preoperational See List 8	WP 05-WH1401 Inspecting for Damage and Deterioration[b]
10	Trailer Jockey	Waste Handling	Preoperational See List 8	WP 05-WH1405 Inspecting for Mechanical Operability[m] and Deterioration[b]
11	Explosion-Isolation Walls	Underground Operations	Quarterly See List 1	Integrity and Deterioration[b] of Accessible Areas
12	Bulkhead in Filled Panels	Underground Operations	Monthly See List 1	Integrity and Deterioration[b] of Accessible Areas

TABLE D-1 (CONTINUED)
INSPECTION SCHEDULE/PROCEDURES NOTES

[a] Inspection may be accomplished as part of or in addition to regularly scheduled preventive maintenance inspections for each item or system. Certain structural systems of the WHB, ~~Waist~~ Waste Hoist and Station A are also subject to inspection following severe natural events including earthquakes, tornados, and severe storms. Structural systems include columns, beams, girders, anchor bolts and concrete walls.

[b] Deterioration includes: obvious visible cracks, erosion, salt build-up, damage, corrosion, loose or missing parts, malfunctions, and structural deterioration.

[c] "Preoperational" signifies that inspections are required prior to the first use during a calendar day. For calendar days in which the equipment is not in use, no inspections are required. For an area this includes: area is clean and free of obstructions (for emergency equipment); adequate aisle space; emergency and communications equipment is readily available, properly located and sign-posted, visible, and operational. For equipment, this includes: checking fluid levels, pressures, valve and switch positions, battery charge levels, pressures, general cleanliness, and that all functional components and emergency equipment is present and operational.

[e] These weekly inspections apply to container storage areas when containers of waste are present for a week or more.

[g] In addition, the water tank levels are maintained by the CMR and level readouts are available at any time.

[h] This organization is responsible for obtaining licenses for radios and frequency assignments. They do periodic checks of frequencies and handle repairs which are performed by a vendor.

[i] Radios are not routinely "inspected." They are operated daily and many are used in day-to-day operations. They are used until they fail, at which time they are replaced and repaired. Radios are used routinely by Emergency Services, Security, Environmental Monitoring, and Facility Operations.

[j] Fire extinguisher inspection is paperless. Information is recorded into a database using barcodes. The database is then printed out.

[k] Surface CH TRU mixed waste handling areas include the Parking Area Unit, the WHB unit, and unloading areas.

[l] No log forms are used for daily readings. However, readings that are out of tolerance are reported to the CMR and logged by CMR operator. Inspection includes daily functional checks of portable equipment.

[m] Mechanical Operability means that the equipment has been checked and is operating in accordance with site safety requirements (e.g. proper fluid levels and tire pressure; functioning lights, alarms, sirens, and power/battery units; and belts, cables, nuts/bolts, and gears in good condition), as appropriate.

[n] Required Equipment means that the equipment identified in Table F-6 is available and usable (i.e. not expired/depleted and works as designed).

* Positions are not considered RCRA positions (i.e., personnel do not manage TRU mixed waste).

Package itself. The Contact Handled Packages have forklift pockets at the bottom of the container specifically for lifting the container with a forklift (see Figure M1-8 in Permit Attachment M1). The 13 ton (11.8 metric tons) electric forklift unloads the TRUPACT-II from the trailer and transfers it to an unloading dock in the WHB Unit. The unloading dock is designed to accommodate the Contact Handled Package and functions as a work platform, providing TRU mixed waste handling and health physics personnel with easy access to the container during unloading operations.

An overhead 6-ton (5.4-metric ton) crane and adjustable center-of-gravity lift fixture transfer TRU mixed waste containers from the Contact Handled Package to a pallet on the WHB Unit floor. The facility pallet is a fabricated steel structure designed to securely hold waste containers. Each facility pallet has a rated load capacity of 25,000 lb (11,340 kg). The upper surface of the facility pallet has two recesses sized to accept the waste containers, ensuring that the containers are held in place. Up to four SWBs, four 7-packs of 55-gallon drums, four 4-packs consisting of 85-gallon drums, four 3-packs of 100-gallon drums, or two TDOPs may be placed on a facility pallet. Each stack of waste containers is strapped down to holding bars in the top reinforcement plate of the facility pallet to avoid spillage during movement. Two rectangular tube openings in the bed allow the facility pallet to be securely lifted by forklift. In order to assure a facility pallet is not overloaded, operationally it will hold the contents of two Contact Handled Packages, as specified in Permit Attachment M1.

The WIPP facility has the capability to handle each of the CH TRU containers singly using forklifts and single container attachments. In such cases, the container would be loaded on the waste shaft conveyance and moved underground as a single unit.

All unloading equipment is inspected in accordance with the schedule shown in Tables D-1 and D-1a. Cranes that are used in the unloading and handling of TRU mixed waste have been designed and constructed so that they will retain their loads in the event of a loss of power. Cranes in the WHB Unit are also designed to withstand a design basis earthquake without moving off of their rails and without dropping their load. Lowering loads is a priority activity after a disruptive event.

The following is a summary of the activities, structures, and equipment that were developed to prevent hazards in transporting TRU mixed waste.

Palletized CH TRU mixed waste is either transferred by a 13-ton (11.8-metric ton) forklift or the facility transfer vehicle, which is designed with an adjustable bed height that is used to transfer the facility pallets to the special pallet-support stands in the waste ~~hoist cage~~ shaft conveyance.

The waste hoist system in the waste shaft and all waste shaft furnishings are designed to resist the dynamic forces of the hoisting system, which are greater than the seismic forces on the underground facilities. In addition the waste ~~hoist~~ shaft conveyance headframe is designed to withstand the design-basis earthquake (**DBE**). Maximum operating speed of the hoist is 500 ft (152.4 m) per minute. During loading and unloading operations, the waste hoist is steadied by fixed guides. The waste hoist is equipped with a control system that will detect malfunctions or abnormal operations of the hoist system, such as overtravel, overspeed, power loss, or circuitry failure. The control response is to annunciate the condition and shut the hoist down. Operator response is required to recover from the automatic shutdown. Waste hoist operation is

continuously monitored by the CMS. A battery powered FM transmitter/receiver allow communication between the hoist conveyance and the hoist house.

The waste hoist ~~shaft system~~ has two pairs of brake calipers acting on independent brake paths. The hoist motor is normally used for braking action of the hoist. The brakes are used to hold the hoist in position during normal operations and to stop the hoist under emergency conditions. Each pair of brake calipers is capable of holding the hoist in position during normal operating conditions and stopping the hoist under emergency conditions. In the event of power failure, the brakes will set automatically.

The hoist is protected by a fixed automatic fire suppression system. Portable fire extinguishers are also provided on the hoist floor and in equipment areas.

Once underground, the facility pallet is removed from the hoist cage by the underground waste transporter (see Figure ~~M2-7~~ M2-6 in Permit Attachment M2), a commercially available articulated diesel vehicle. The trailer is designed specifically for transporting palletized TRU mixed waste and is sized to accommodate the facility pallet. All motorized waste handling equipment is equipped with on-board fire-suppression systems.

The underground waste transporter is equipped with a fire suppression system, rupture-resistant diesel fuel tanks, and reinforced fuel lines to minimize the potential for a fire involving the fuel system. Waste containers will be placed into underground HWDUs using a forklift and attachments.

All CH TRU mixed waste transport equipment is inspected at a frequency indicated in Table D-1.

RH TRU Mixed Waste

Cranes and forklifts that are used to unload and handle RH TRU mixed waste have been designed and constructed to retain their loads in the event of a loss of power. RH TRU mixed waste received in an RH-TRU 72-B cask is unloaded from the trailer in the RH Bay, using the RH Bay Overhead Bridge Crane, and is placed on the cask transfer car. The cask transfer car moves the RH-TRU 72-B cask into the Cask Unloading Room, where a bridge crane lifts the cask from the cask transfer car and lowers it into the Transfer Cell and onto the Transfer Cell shuttle car. The Transfer Cell shuttle car moves the RH-TRU 72-B cask into position for transferring the canister to the facility cask.

RH TRU mixed waste received in a CNS 10-160B cask is unloaded from the trailer in the RH Bay using the RH Bay overhead bridge crane and is placed on the cask transfer car. The cask transfer car moves the CNS 10-160B cask into the Facility Cask Unloading Room. The Hot Cell crane lifts the two drum carriage units from the CNS 10-160B cask in the Facility Cask Unloading Room into the Hot Cell, where the drums are transferred into RH TRU mixed waste facility canisters using the Overhead Powered Manipulator or Hot Cell Crane. The facility canisters are then lowered into a shielded insert on the Transfer Cell Shuttle Car in the Transfer Cell. The Transfer Cell Shuttle Car moves the shielded insert into position for transferring the facility canister to the facility cask.

A remotely-operated fixed hoist grapple lifts the canister from the RH-TRU 72-B cask or from the shielded insert on the Transfer Cell shuttle car and transfers the canister into the facility cask located on the facility cask transfer car in the Facility Cask Loading Room. The facility cask is rotated to a horizontal position on the Facility Cask Transfer Car and the Facility Cask Transfer Car moves onto the waste ~~hoist~~ shaft conveyance and is lowered underground.

Once underground, the RH TRU mixed waste handling forklift lifts the facility cask from the Facility Cask Transfer Car and carries the facility cask to the Horizontal Emplacement and Retrieval Equipment (**HERE**). After placing the facility cask on the HERE, the canister is emplaced in the wall of the disposal room.

Pertinent RH TRU mixed waste transport equipment is inspected at a frequency indicated in Table D-1a.

Figures of RH TRU mixed waste emplacement equipment are included in Attachments M1 and M2.

E-2b Runoff

The following description of procedures, structures, or equipment used at the WIPP facility to prevent runoff from TRU mixed waste handling areas to other areas of the facility or environment or to prevent flooding is required by 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(8)(ii)).

The WHB Unit is a physical barrier that will prevent TRU mixed waste spills from reaching the environment before a cleanup could be initiated and completed. A detailed description of the WHB containment capability for the CH Bay and RH Complex is contained in Permit Attachment M1. Secondary containment is also provided by the shipping containers while waste are within them. These are sealed vessels with no open vents and therefore cannot leak.

TRU mixed waste received for emplacement at the WIPP facility must be certified under this Permit's Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (**TSDF-WAC**) as nonliquid waste; in some cases, the Permit allows up to one percent residual liquids. The TSDF-WAC are procedural controls that must be met at the generator or storage site and the data must be verified by the WIPP facility staff prior to acceptance for the Disposal Phase and shipment to the WIPP facility. Permit Module II and Permit Attachment B contain information regarding TSDF-WAC requirements for shipping and discusses receipt and verification of the TRU mixed waste at the WIPP facility. Derived waste must also meet all TSDF-WAC requirements prior to disposal. Calculations in Permit Attachment M1 demonstrate that one percent residual liquid in TRU mixed waste containers is easily contained by the WHB Unit floor.

The WIPP facility does not lie within a 100-year floodplain. There are no major surface-water bodies within 5 mi (8 km) of the site, and the nearest river, the Pecos River, is approximately 12 mi (19 km) away. The general ground elevation in the vicinity of the surface facilities (approximately 3,400 ft [1,036 m] above mean sea level) is about 500 ft (152 m) above the riverbed and 400 ft (122 m) above the 100-year floodplain. Protection from flooding or ponding caused by probable maximum precipitation (**PMP**) events is provided by the diversion of water away from the WIPP facility by a system of peripheral interceptor berms and dikes. Additionally,

- Adequate aisle space is maintained for emergency response purposes, as discussed in Section E-1b of this Permit Attachment.

- Procedures to protect personnel from hazardous and/or TRU mixed waste during nonroutine events are detailed in Permit Attachment F.

The following discusses the structures and equipment that prevent undue exposures of personnel at the WIPP facility to hazardous constituents:

- The WIPP facility was sited and designed to be protective of human health and ensure safe operations during the Disposal Phase.

- TRU mixed waste containers are required to meet shipping/structural requirements.

- The shipping container, forklifts, unloading dock, crane, facility pallets, containment pallets, facility transfer vehicle, waste ~~hoist cage~~ shaft conveyance, and underground waste transporter were designed or selected for use in order to minimize the need for CH TRU mixed waste handling personnel to come into contact with CH TRU mixed waste. Each of these items is discussed in detail in Permit Attachments M1 and M2; Section E-2a of this Permit Attachment discusses prevention of hazards to personnel during unloading operations.

- The shipping containers, forklifts, cranes, cask shuttle, transfer cars, manipulators, Hot Cell, waste ~~hoist cage~~ shaft conveyance, and HERE were designed or selected for use in order to minimize the need for RH TRU mixed waste handling personnel to come into contact with RH TRU mixed waste. These items are discussed in Permit Attachments M1 and M2. Section E-2a of this Permit Attachment discusses in detail prevention of hazards to personnel during unloading operations.

- The hood ventilation system, used during the initial opening of Contact Handled Packages, is used to vent any potential release of radioactive contaminants into the ventilation system of the WHB Unit (Permit Attachment M1).

- Differential air pressure between the RH TRU mixed waste handling locations in the RH Complex protects workers and prevents potential spread of contamination during handling of RH TRU mixed waste. Airflow between key rooms in the WHB are controlled by maintaining differential pressures between the rooms. The CH Receiving Bay is maintained with a negative pressure relative to outside atmosphere. The RH Receiving Bay is maintained with a requirement to be positive pressure relative to the CH Receiving Bay. The RH Hot Cell is maintained with a negative differential pressure relative to the RH Receiving Bay. The Hot Cell ventilation is exhausted through high-efficiency particulate air filters prior to venting through the WHB filtered exhaust.

- The WIPP facility has internal and external communications and alarm systems to notify personnel of emergency situations and provide instructions for response,

F-1d Description of Containers

CH TRU mixed waste containers will be either 55-gallon (gal) (208-liter (L)) drums singly or arranged into seven (7)-packs, 85-gal (321-L) drums (used as singly or arranged into four (4)-packs, 100-gal (379 L) drums singly or arranged into three (3)-packs, ten-drum overpacks (**TDOP**), or 66.3 ft^3 (1.88 m^3) SWBs.

RH TRU mixed waste containers are either canisters or drums. Canisters will be loaded singly in an RH-TRU 72-B cask and drums will be loaded in a CNS 10-160B cask. Drums in the CNS 10-160B cask will be arranged singly or in drum carriage units containing up to five drums each. Canisters and drums are described in Permit Attachment M1.

F-1e Description of Surface Hazardous Waste Management Units

The WHB is the surface facility where waste handling activities will take place. The WHB has a total area of approximately 84,000 square feet (ft^2) (7,804 square meters [m^2]) of which 43,554 ft^2 (4,047 m^2) are designated as the WHB Unit for TRU mixed waste management. Within the WHB Unit, 26,151 ft^2 (2,430 m^2) are designated for the waste handling and container storage of CH TRU mixed waste and 17,403 ft^2 (1,617 m^2) are designated for the handling and storage of RH TRU mixed waste. These areas are being permitted as container storage units. The concrete floors within the WHB Unit are sealed with an impermeable coating that has excellent resistance to the chemicals in TRU mixed waste and, consequently, provide secondary containment for TRU mixed waste. In addition, a Parking Area Unit south of the WHB will be used for storage of waste in sealed shipping containers awaiting unloading. This area is also being permitted as a container storage unit. The sealed shipping containers provide secondary containment in this hazardous waste management unit (**HWMU**).

F-1e(1) CH Bay Operations

Once unloaded from the Contact-Handled Package, CH TRU mixed waste containers (7-packs of 55-gal drums, 3-packs of 100-gal drums, 4-packs of 85-gal drums, SWBs, or TDOPs) are placed in one of two positions on the facility pallet. The waste containers are stacked on the facility pallets (one- or two-high, depending on weight considerations). The use of facility pallets will elevate the waste at least 6 inches (in.) (15 centimeters [cm]) from the floor surface. Pallets of waste will then be ~~relocated to the northeast area of~~ stored in the CH bay ~~for normal storage~~. This storage area will be clearly marked to indicate the lateral limits of the storage area. This storage area will have a maximum capacity of ~~seven~~ thirteen facility pallets of waste during normal operations. These pallets will typically be ~~staged in this area~~ in the CH Bay storage area for a period of up to five days.

In addition, four Contact-Handled Packages, containing up to 640 ft^3 of CH TRU waste in containers, may occupy ~~the staging~~ positions at the TRUPACT-II Unloading Docks (**TRUDOCK**).

Aisle space shall be maintained in all CH Bay waste storage areas. The aisle space shall be adequate to allow unobstructed movement of fire response personnel, spill-control equipment, and decontamination equipment that would be used in the event of an off-normal event. An aisle

space between facility and containment pallets will be maintained in all CH TRU mixed waste storage areas.

F-1e(2) RH Complex Operations

Loaded RH TRU casks are received in the RH Bay of the WHB. The RH Bay is served by an overhead bridge crane used for cask handling and maintenance operations. Storage in the RH Bay occurs in the RH-TRU 72-B or CNS 10-160B casks. A maximum of two loaded casks may be stored in the RH Bay and a maximum of one cask in the Cask Unloading Room may be stored at one time. A minimum of 44 inches (1.1 m) will be maintained between loaded casks in the RH Bay. The cask serves as secondary containment in the RH Bay for the RH TRU mixed waste payload container. In addition, the RH Bay has a concrete floor.

Single RH TRU mixed waste canisters are unloaded from the RH-TRU 72-B casks in the Transfer Cell of the RH Complex where they are transferred to facility casks. Drums of RH TRU mixed waste will be transferred remotely from the CNS 10-160B cask, into the Hot Cell, and loaded into a canister. Storage in the Hot Cell occurs in either drums or canisters. A maximum of 12 55-gallon drums of RH TRU mixed waste and one 55-gallon drum of derived waste (94.9 ft^3 (2.7 m^3)) may be stored in the Hot Cell. Except for the derived waste drum, individual 55-gallon drums may not be stored in the Hot Cell for more than 25 days. The Transfer Cell houses the Transfer Cell Shuttle Car, which is used to facilitate transferring the canister to the facility cask. Storage in this area typically occurs at the end of a shift or in an off-normal event that results in the suspension of waste handling. A maximum of one canister (31.4 ft^3 (0.89 m^3)) may be stored in the Transfer Cell in a shielded insert in the Transfer Cell Shuttle Car or in a RH-TRU 72-B cask.

The Facility Cask Loading Room provides for transfer of a canister to the facility cask for subsequent transfer to the waste ~~hoist~~ shaft conveyance and to the Underground Hazardous Waste Disposal Unit. The Facility Cask Loading Room also functions as an air lock between the waste shaft and the Transfer Cell. Storage in this area typically occurs at the end of a shift or in an off-normal event that results in the suspension of waste handling. A maximum of one canister (31.4 ft^3 (0.89 m^3)) may be stored in the Facility Cask in the Facility Cask Loading Room.

Derived waste will be stored in the RH Bay and in the Hot Cell.

F-1e(3) Parking Area Container Storage Unit (Parking Area Unit)

The area extending south from the WHB within the fenced enclosure identified as the Controlled Area on Figure M1-2 is defined as the Parking Area Container Storage Unit. This area provides storage for up to 6,734 ft^3 (191 m^3) of CH and/or RH TRU mixed waste contained in up to 40 loaded Contact-Handled Packages and 8 Remote-Handled Packages. Secondary containment and protection of the waste containers from standing rainwater are provided by the transportation containers. Up to 12 additional Contact-Handled Packages and four additional Remote-Handled Packages may be stored in the Parking Area Surge Area so long as the requirements of Permit Conditions III.A.2.c and III.A.2.d are met. No more than 50 Contact-Handled and 12 Remote-Handled Packages may be stored in the Parking Area Storage Unit.

TABLE F-1
HAZARDOUS SUBSTANCES IN LARGE ENOUGH QUANTITIES TO CONSTITUTE A LEVEL II INCIDENT

Chemical Description	Building Location	Hazard Category
Ethylene Glycol Solution - 35%	Buildings 411; 412; 451; 452; 486; 463; 474C; FAC 414	Immediate (acute) Delayed (chronic)
Gasoline, Unleaded GASC0001	FAC 480	Fire Immediate (acute) Delayed (chronic)
No. 1 Diesel Fuel Oil GASC0210	~~S-1300 Maint Shop~~ Oil Depot U/G; FACs 480, 255.1 & 255.2; Transport Tank; Building 456 Trailer 911F	Fire Immediate (acute) Delayed (chronic)
Multiple containers of TRU Waste as described in Permit Condition III.C.1	WHB Waste Shaft U/G	Delayed (chronic)
Hazardous materials in quantities that exceed 5 times the Reportable Quantity (Per DOE O 151.1) values as defined in 40 CFR 302	It should be noted that WIPP is not expected to possess such quantities.	Fire Immediate (acute) Delayed (chronic)

TABLE F-3
PLANNING GUIDE FOR DETERMINING INCIDENT LEVELS AND RESPONSE

INCIDENT CONDITION	INCIDENT LEVEL		
	I	II *	III *
Product identifications	Placard not required, NFPA 0 or 1 all categories, all Other Regulated Materials A, B, C, and D.	DOT placarded, NFPA 2 for any categories, PCBs without fire, EPA regulated waste. SITE SPECIFIC: Table F-1 ~~G-1~~ and TRU mixed waste AND	Poison A (gas), explosive A/B, organic peroxide, flammable, solid, materials dangerous when wet, chlorine, fluorine, anhydrous ammonia, radioactive materials, NFPA 3 and 4 for any categories including special hazards, PCBs and fire including special hazards, PCBs and fire DOT inhalation hazard, EPA extremely hazardous substances, and cryogenics.
Container size	Container size does not impact this incident level.	Involves multiple packages.	Tank truck.
Fire/explosion potential	Under control.	May spread/may be explosive.	May spread/may be explosive.
Leak severity	No release or small release contained or confined with readily available resources.	Release may not be controllable without special resources.	Release may not be controllable even with special resources.
Life safety	No life-threatening situation from materials involved.	Localized area, limited evacuation area.	Localized area, limited evacuation area.
Environmental impact (Potential)	None.	Limited to incident boundaries	Contained within the Hazardous waste Management Units.
Container integrity	Not damaged.	Damaged but able to contain the contents to allow handling or transfer of product.	Damaged to such an extent that catastrophic rupture is possible.

* Contingency Plan is implemented

TABLE F-6
EMERGENCY EQUIPMENT MAINTAINED AT THE WASTE ISOLATION PILOT PLANT

Equipment	Description and Capabilities	Location
Personal Protection Equipment		
Headlamps	Mounted on hard hat; battery operated	Each person underground
Underground Self-Rescuer Units	Short-term rebreathers; approximately 300	Each person underground
Self-Contained Self-Rescuer	At least 60 minutes of oxygen available. Approximately 400 units cached throughout the underground	Cached throughout the underground
Self-Contained Breathing Apparatus (SCBA)	Oxygen supply; 4-hour units; approximately 14 Mine Rescue Team Draeger units	Mine Rescue Training Room
Chemical and Chemical-Supported Gloves	Body protection; (12 pair) inner-cloth, (12 pair) outer-pvc, (5 pair) outer-viton	HAZMAT trailer
Suit, Acid	Body protection; (4) acid	HAZMAT trailer
Suit, Fully Encapsulated	Body protection; used with SCBAs; full outerboot; (4) Level A; (4) Level B	HAZMAT trailer
Emergency Medical Equipment		
Antishock Trousers	Shock treatment; (2) inflatable, one on each ambulance	Ambulance # 1 and # 2
Zoll 1600 Heart Monitor and Defibrillator	Heart Monitor/defibrillator	Ambulance # 1 and # 2
Oxygen	Patient care; Size D: (2) Ambulance #1 (1) Underground Ambulance (1) Health Services Size E: (1) Rescue Truck (2) Underground Ambulance Size M: (1) Ambulance #1	Ambulance # 1 and # 2, surface rescue truck

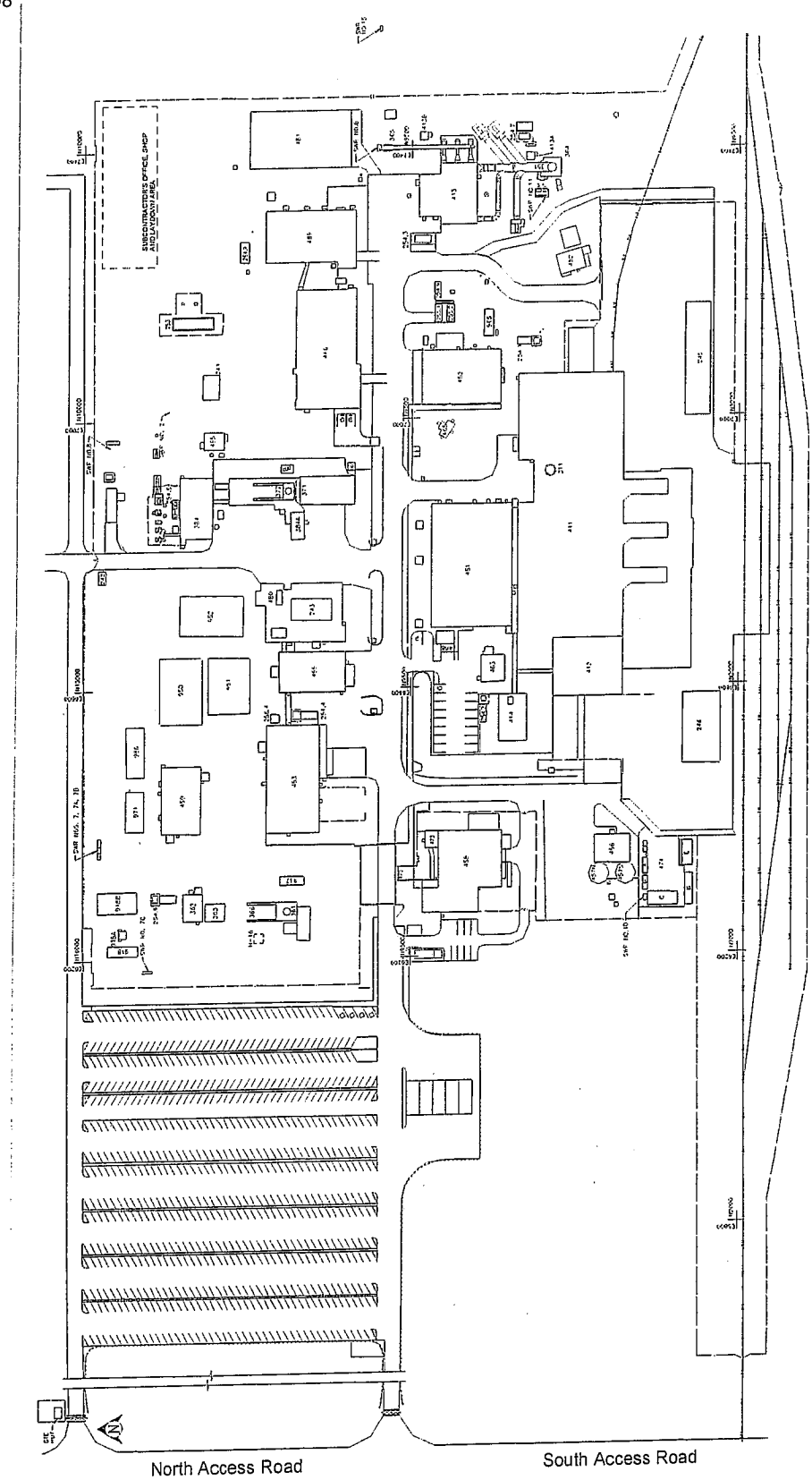


Figure F-1
WIPP Surface Structures

BLDG./ FAC. #	DESCRIPTION
#241	EQUIPMENT SHED
#242	GUARDSHACK
#243	SALT HAULING TRUCKS SHELTER
#245	TRUPACT TRALER SHELTER
#246	MgO STORAGE SHELTER
#253	13.8 KV SWITCHGEAR 25P-SWG15/1
#254.1	AREA SUBSTATION NO. 1 25P-SW15.1
#254.2	AREA SUBSTATION NO. 2 25P-SW15.2
#254.3	AREA SUBSTATION NO. 3 25P-SW15.3
#254.4	AREA SUBSTATION NO. 4 25P-SW15.4
#254.5	AREA SUBSTATION NO. 5 25P-SW15.5
#254.6	AREA SUBSTATION NO. 6 25P-SW15.6
#254.7	AREA SUBSTATION NO. 7 25P-SW15.7
#254.8	AREA SUBSTATION NO. 8 25P-SW15.8
#254.9	480V SWITCHGEAR (25P-SWGO4/9)
#255.1	BACK-UP DIESEL GENERATOR #1 25-PE 503
#255.2	BACK-UP DIESEL GENERATOR #2 25-PE 504
#256.4	SWITCHBOARD #4 (25P-SBD04/4)
#311	WASTE SHAFT
#351	EXHAUST SHAFT
#361	AIR INTAKE SHAFT
#362	AIR INTAKE SHAFT/HOIST HOUSE
#363	AIR INTAKE SHAFT/WINCH HOUSE
#364	EFFLUENT MONITORING INSTRUMENT SHED A
#365	EFFLUENT MONITORING INSTRUMENT SHED B
#366	AIR INTAKE SHAFT HEADFRAME
#371	SALT HANDLING SHAFT
#372	SALT HANDLINT SHAFT HEADFRAME

BLDG./ FAC. #	DESCRIPTION
#384	SALT HANDLING SHAFT HOISTHOUSE
#384A	MINING OPERATIONS
#411	WASTE HANDLING BUILDING
#412	TRUPACT MAINTENANCE BUILDING
#413	EXHAUST SHAFT FILTER BUILDING
#413A	MONITORING STATION A
#413B	MONITORING STATION B
#414	WATER CHILLER FACILITY & BLDG
#451	SUPPORT BUILDING
#452	SAFETY & EMERGENCY SERVICES FACILITY
#453	WAREHOUSE/SHOPS BUILDING
#455	AUXILLIARY WAREHOUSE BUILDING
#456	WATER PUMPHOUSE
#457N	WATER TANK 25-D-001A
#457S	WATER TANK 25-D-001B
#458	GUARD AND SECURITY BUILDING
#459	CORE STORAGE BUILDING
#463	COMPRESSOR BUILDING
#465	AUXILLIARY AIR INTAKE
#468	TELEPHONE HUT
#473	ARMORY BUILDING
#474	HAZARDOUS WASTE STORAGE FACILITY
#474A	HAZARDOUS WASTE STORAGE BUILDING
#474B	HAZARDOUS WASTE STORAGE BUILDING
#474C	OIL & GREASE STORAGE BUILDING
#474D	GAS BOTTLE STORAGE BUILDING
#474E	HAZARD MATERIAL STORAGE BUILDING
#474F	WASTE OIL RETAINER

BLDG./ FAC. #	DESCRIPTION
#475	GATEHOUSE
#480	VEHICLE FUEL STATION
#481	WAREHOUSE ANNEX
#482	EXHAUST SHAFT HOIST EQUIP. WAREHOUSE
#485	SULLAIR COMPRESSOR BUILDING
#486	ENGINEERING BUILDING
#489	TRAINING BUILDING
#H-16	SANDIA TEST WELL
#917	AIS MONITORING
#918	VOC TRAILER
#918A	VOC AIR MONITORING STATION
#918B	VOC LAB TRAILER
#950	WORK CONTROL TRAILER
#951	PROCUREMENT/PURCHASING
#952	TRAILER
#965	SAMPLE LABORATORY TRAILER
#971	HUMAN RESOURCES TRAILER
#986	PUBLICATIONS & PROCEDURES TRAILER
SWR NO. 6	SWITCHRACK NO. 6
SWR NO. 7, 7A, 7B	SWITCHRACK NO. 7, 7A, 7B
SWR NO. 7C	SWITCHRACK NO. 7C
SWR NO. 10	SWITCHRACK NO. 10
SWR NO. 11	SWITCHRACK NO. 11
SWR NO. 12	SWITCHRACK NO. 12
SWR NO. 15	SWITCHRACK NO. 15

Figure F-1a
Legend to Figure F-1

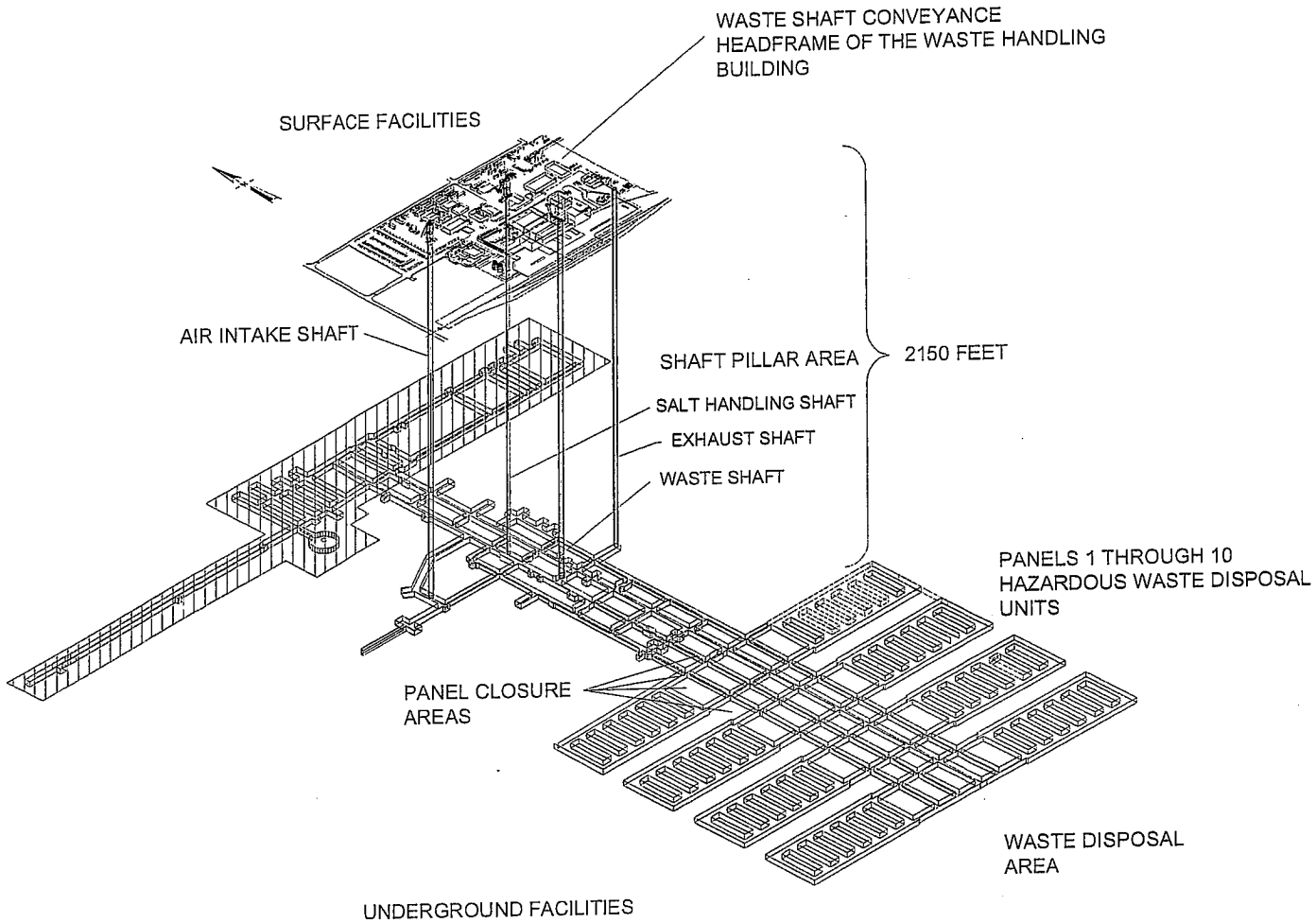


Figure F-2
Spatial View of the WIPP Facility

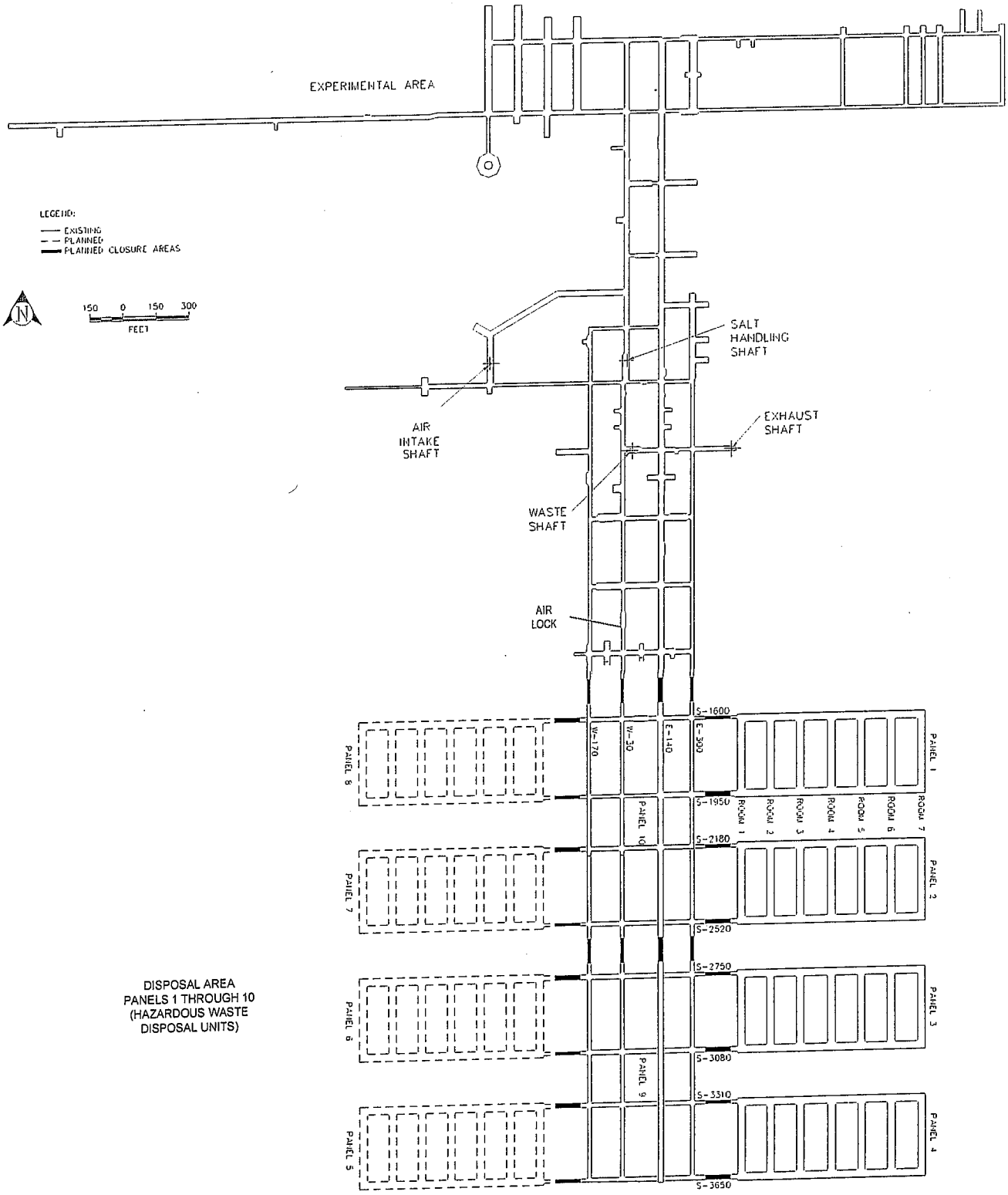


Figure F-3
WIPP Underground Facilities

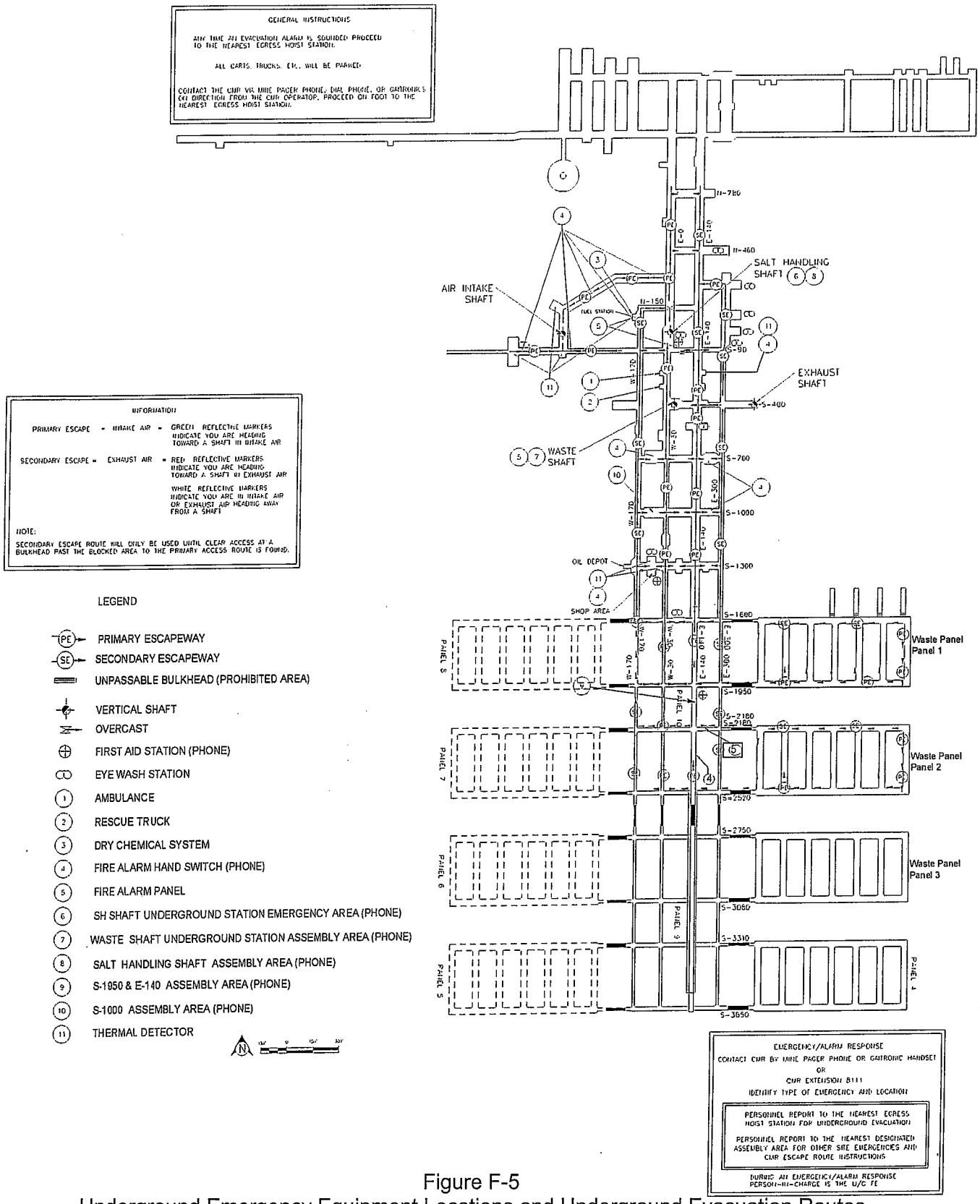


Figure F-5
Underground Emergency Equipment Locations and Underground Evacuation Routes

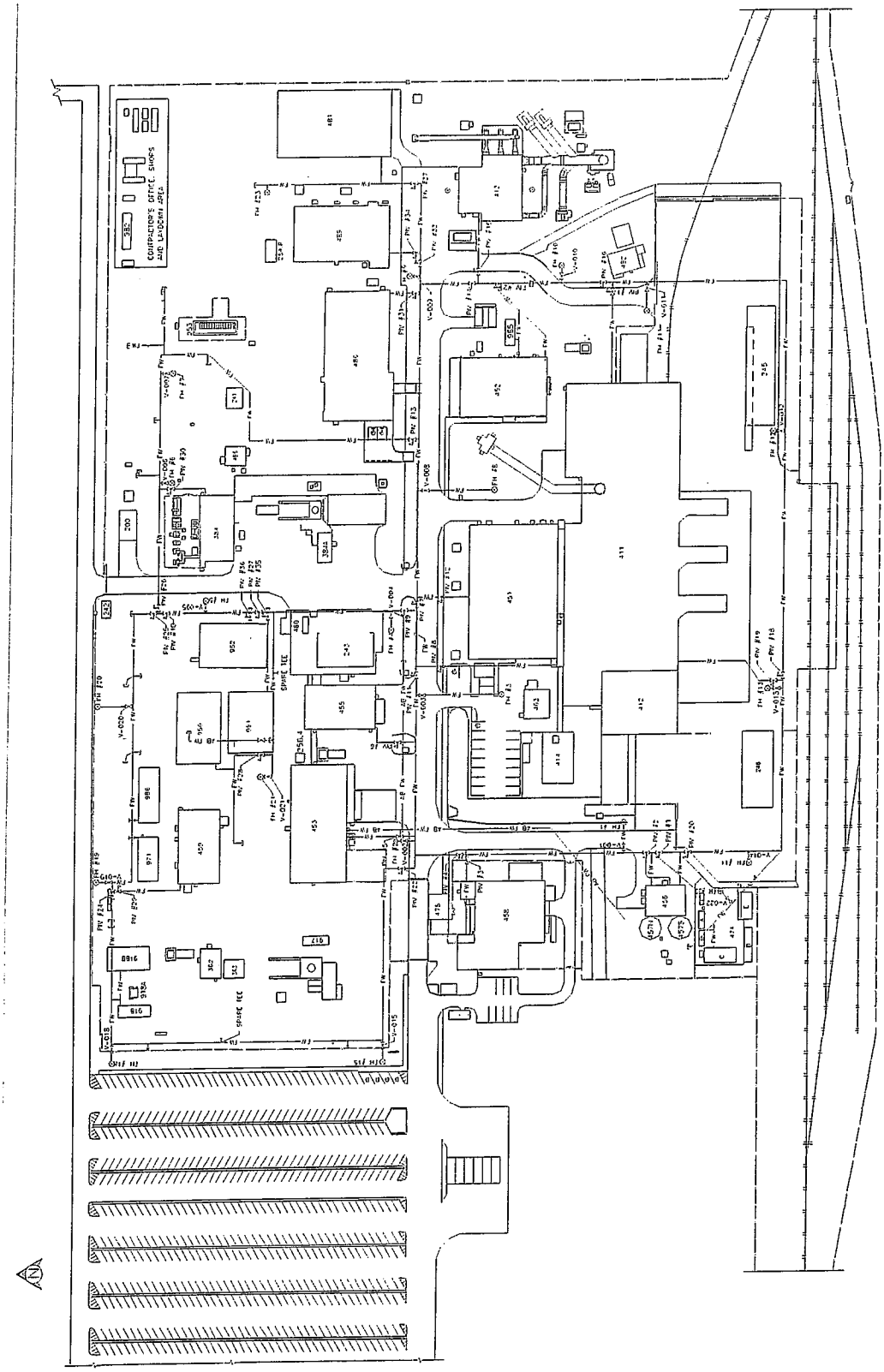


Figure F-6
Fire-Water Distribution System

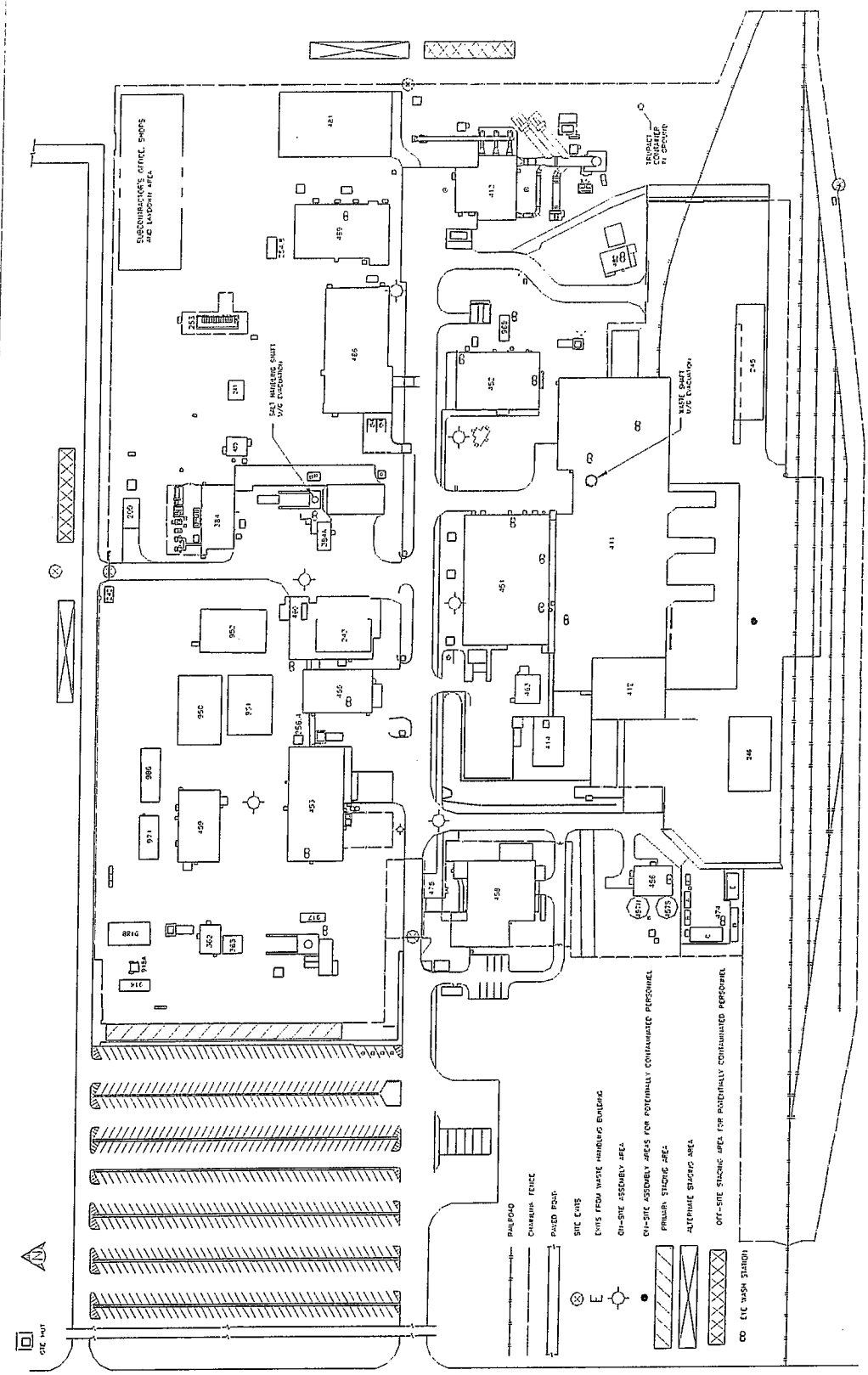
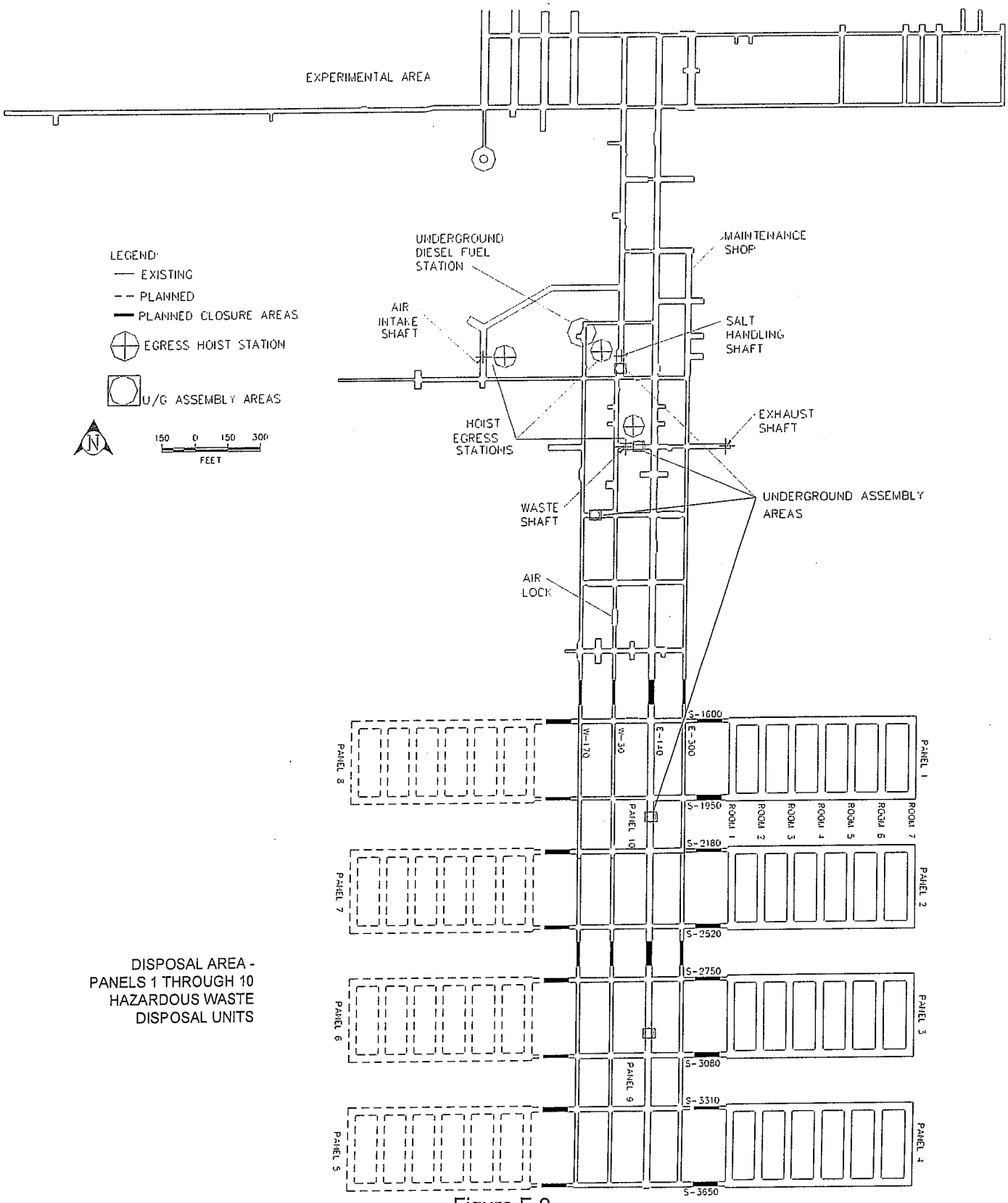


Figure F-8
WIPP On-Site Assembly Areas and WIPP Staging Areas



DISPOSAL AREA - PANELS 1 THROUGH 10 HAZARDOUS WASTE DISPOSAL UNITS

Figure F-9
Designated Underground Assembly Areas

Asphalt Concrete Thickness TAC:
GE=0.0032 x TI x (100 -R)....R=80
GE - Gravel Equivalent (Ft).
GE=0.0032 x 7.5 x 20 = 0.48' ...GfAC = 2.01⇒ TAC = 0.48/2.01= 0.24' ⇒ use 2½" AC Surface Course.
(Actually used: 3")
Gf - Gravel Equivalent Factor (constant from Table 7-651.2C from HDM).

B. Bituminous Treated Base
GE = 0.0032 x TI x (100 -R) .... R = 55 ~ caliche subbase ⇒ GE = 1.08' GEBTB = 1.08 - 2.01 x 0.21= 0.66'
TBTB = GEBTB/GfBTB = 0.66/1.2 = 0.55' ⇒ Use 4" BTB
GfBTB ~ taken from table 7-651.2C

C. Caliche Subbase ~ TCSB
GE = 0.0032 x TI x (100 -R) .....R=50 - prepared subgrade
GE=1.2
GECSB=1.2 - (0.21x 2.07) - (0.33 x1.2) ⇒ 0.37'
TCBS=0.37/1.0=0.37' ~ 4½"

Based on the results of the above calculation, the site paved roads designated for waste transportation are safe to be used by the heavier truckloads carrying shipping casks used in RH TRU mixed waste transportation to the WIPP.

G-3 Waste Handling Building Traffic

CH TRU mixed waste will arrive by tractor-trailer at the WIPP facility in sealed Contact Handled Packages. Upon receipt, security checks, radiological surveys, and shipping documentation reviews will be performed. A forklift will remove the Contact Handled Packages and transport them a short distance through an air lock that is designed to maintain differential pressure in the WHB. The forklift will place the shipping containers at one of the two TRUPACT-II unloading docks (**TRUDOCK**) inside the WHB.

The TRUPACT-II may hold up to two 55-gallon drum seven (7)-packs, two 85-gallon drum four (4)-packs, two 100-gallon drum three (3)-packs, two standard waste boxes (SWB), or one ten-drum overpack (**TDOP**). A HalfPACT may hold seven 55-gallon drums, one SWB, or four 85-gallon drums. A six-ton overhead bridge crane will be used to remove the contents of the Contact Handled Package. Waste containers will be surveyed for radioactive contamination and decontaminated or returned to the Contact Handled Package as necessary.

Each facility pallet will accommodate four seven(7)-packs of 55-gallon drums, four SWBs, four four(4)-packs of 85-gallon drums, four three(3)-packs of 100-gallon drums, two TDOPs, or any combination thereof. Waste containers will be secured to the facility pallet prior to transfer. A forklift or facility transfer vehicle will transport the loaded facility pallet the air lock at the Waste Shaft (Figure G-3). The facility transfer vehicle will be driven onto the waste ~~hoist~~ shaft conveyance deck, where the loaded facility pallet will be transferred to the waste ~~hoist~~ shaft conveyance and downloaded for emplacement.

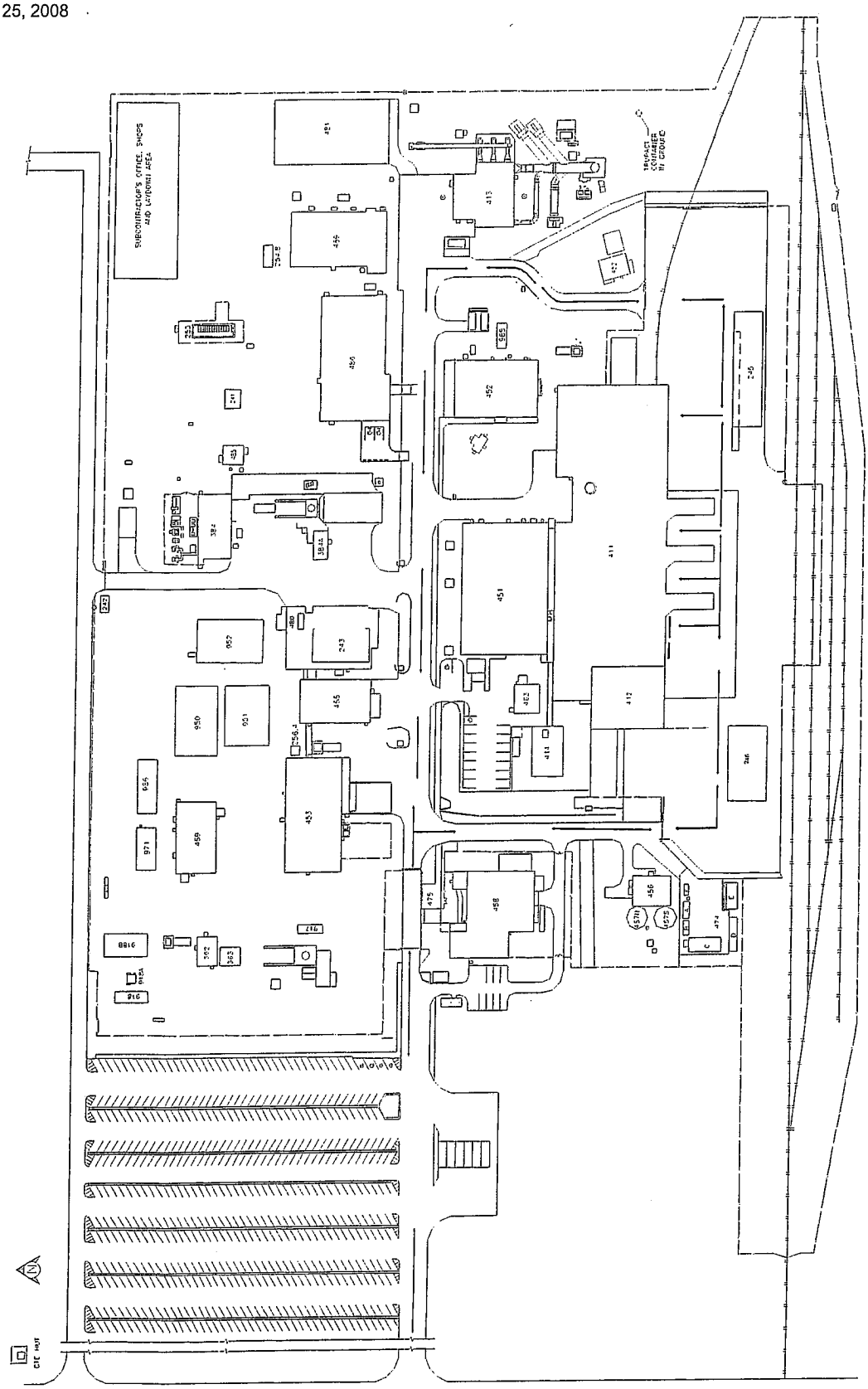


Figure G-2
WIPP Traffic Flow Diagram

ATTACHMENT H1

RCRA HAZARDOUS WASTE MANAGEMENT JOB TITLES AND DESCRIPTIONS

TABLE OF CONTENTS

RCRA Hazardous Waste Management Job Descriptions

Position Title: Underground Hazardous Waste Worker

Duties:

- Move waste from generation point to waste ~~hoist~~ shaft conveyance
- Containerize waste generated at the wash bay and exhaust shaft catchment basin

Requisite Skills, Experience and Education:

High school diploma or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X) (Annual)
- Hazardous Waste Worker (HWW-101/102) (Annual)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Manager, ~~Shipping Coordination~~ Transportation Operations

Duties:

- Oversee all TRU waste and non-TRU handling activities conducted by ~~Shipping Coordination~~ Transportation Operations

Requisite Skills, Experience and Education:

B.S. degree, or equivalent, in nuclear-related field.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Hazardous Waste Worker Supervisor (HWS-101/101A)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Waste Hoist Shaft Tender

Duties:

- Oversees and directs loading and unloading of the Waste ~~Hoist~~ Shaft Conveyance above and below ground

Requisite Skills, Experience and Education:

Vocational or academic high school graduate, or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Hazardous Waste Worker (HWW-101/102)
- Waste Hoist Shaft Tender (M-31)

ATTACHMENT I

CLOSURE PLAN

Introduction

This Permit Attachment contains the Closure Plan that describes the activities necessary to close the Waste Isolation Pilot Plant (**WIPP**) individual units and facility. Since the current plans for operations extend over several decades, the Permittees will periodically reapply for an operating permit in accordance with Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1 (**20.4.1 NMAC**), Subpart 900 (incorporating 40 CFR §270.10(h)). Consequently, this Closure Plan describes several types of closures. The first type is panel closure, which involves constructing closures in each of the underground hazardous waste disposal units (**HWDUs**) ~~when~~ after they are filled. The second type is partial closure, which can be less than the entire facility and therefore less than an entire unit as described herein for the Waste Handling Building (**WHB**) Unit and the Parking Area Unit (**PAU**). The third type of closure is final facility closure at the end of the Disposal Phase, which will entail "clean" closure of all remaining surface storage units and construction of the four shaft seal systems. Finally, in the event a new permit is not issued prior to expiration of an existing permit, a modification to this Closure Plan will be sought to perform contingency closure. Contingency closure defers the final closure of waste management facilities such as the Waste Handling Building Container Storage Unit (**WHB Unit**), the conveyances, the shafts, and the haulage ways because these will be needed to continue operations with non-mixed Transuranic (**TRU**) waste.

The hazardous waste management units (**HWMUs**) addressed in this Closure Plan include the aboveground HWMU in the WHB, the parking area HWMU, and Panels 1 through 7, each consisting of seven rooms.

This plan was submitted to the New Mexico Environment Department (**NMED**) and the U.S. Environmental Protection Agency (**EPA**) in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(13)). Closure at the panel level will include the construction of barriers to limit the emission of hazardous waste constituents from the panel into the mine ventilation air stream below levels that meet environmental performance standards[1] and to mitigate the impacts of methane buildup and deflagration that may be postulated for some closed panels. The Post-Closure Plan (Permit Attachment J) includes the implementation of institutional controls to limit access and groundwater monitoring to assess disposal system performance. Until final closure

[1] The mechanism for air emissions prior to closure is different than the mechanism after closure. Prior to closure, volatile organic compounds (VOC) will diffuse through drum filters based on the concentration gradient between the disposal room and the drum headspace. These VOCs are swept away by the ventilation system, thereby maintaining a concentration gradient that is assumed to be constant. Hence, the VOCs in the ventilation stream are a function of the number of containers only. After closure, the panel air will reach an equilibrium concentration with the drum headspace and no more diffusion will occur. The only mechanism for release into the mine ventilation system is due to pressure that builds up in the closed panel. This pressure arises from the creep closure mechanism that is reducing the volume of the rooms and from the postulated generation of gas as the result of microbial degradation of organic matter in the waste. Consequently, the emissions after panel closure are a direct function of pressurization processes and rates within the panel.

waste per panel is used. This equates to 662,150 ft^3 (18,750 m^3) of contact-handled (**CH**) TRU mixed waste and 22,950 ft^3 (650 m^3) of RH TRU mixed waste per panel.

The maximum extent of operations during the term of this permit is expected to be Panels 1 through 7 as shown on Figure I-1, the WHB Container Storage Unit, and the Parking Area Container Storage Unit. Note that panels 8, 9, and 10 are scheduled for excavation only under the initial term of this permit. If other waste management units are permitted during the Disposal Phase, this Closure Plan will be revised to include the additional waste management units. At any given time during disposal operations, it is possible that multiple rooms may be receiving TRU mixed waste for disposal at the same time. Underground HWDUs in which disposal has been completed (i.e., in which CH and RH TRU mixed waste emplacement activities have ceased) will undergo panel closure.

I-1d Schedule for Closure

For the purpose of establishing a schedule for closure, an operating and closure period of no more than thirty-five (35) years (twenty-five (25) years for disposal operations and ten (10) years for closure) is assumed. This operating period may be extended or shortened depending on a number of factors, including the rate of waste approved for shipment to the WIPP facility and the schedules of TRU mixed waste generator sites, and future decommissioning activities.

I-1d(1) Schedule for Panel Closure

The anticipated schedule for the closure of the underground HWDUs known as Panels 3 through 8 is shown in Figure I-2. This schedule assumes there will be little contamination within the exhaust drift of the panel. Underground HWDUs should be ready for closure according to the schedule in Table I-1. These dates are estimates for planning and permitting purposes. Actual dates may vary depending on the availability of waste from the generator sites.

In the schedule in Figure I-2, notification of intent to close occurs thirty (30) days before placing the final waste in a panel. Once a panel is full, the Permittees will initially block ventilation through the panel as described in Permit Attachment M2 and then will assess the closure area for ground conditions and contamination so that a definitive schedule and closure design can be determined. If as the result of this assessment the Permittees determine that a panel closure cannot be emplaced in accordance with the schedule in this Closure Plan, a modification will be submitted requesting an extension to the time for closure.

The Permittees will initially block ventilation through Panel 2 as described in Permit Attachment M2 once Panel 2 is full to ensure continued protection of human health and the environment. The Permittees will then install the explosion-isolation wall portion of the panel closure system that is described in Permit Attachment I1, Section 3.3.2, Explosion- and Construction-Isolation Walls. Construction of the explosion-isolation wall will not exceed 180 days after the last receipt of waste in Panel 2. Final closure of Panels 1 and 2 will be completed as specified in this Permit no later than ~~June 30, 2009~~ January 31, 2016.

To ensure continued protection of human health and the environment, the Permittees will initially block ventilation through Panel 3 as described in Permit Attachment M2, Section M2-2a(3), after waste disposal in Panel 3 has been completed. The Permittees shall continue VOC

monitoring in Panel 3 until final panel closure. If the measured concentration, as confirmed by a second sample, of any VOC in Panel 3 exceeds the "95% Action Level" in Module IV, Table IV.F.3.b, the Permittees will initiate closure of Panel 3 by installing the 12-foot explosion-isolation wall as described in Section I-1e(1) and submit a Class 1* permit modification request to extend Panel 3 closure, if necessary. Regardless of the outcome of disposal room VOC monitoring , final closure of Panel 3 will be completed as specified in this Permit no later than ~~June 30, 2009~~ January 31, 2016.

I-1d(2) Schedule for Final Facility Closure

The Disposal Phase for the WIPP facility is expected to require a period of twenty-five (25) years beginning with the first receipt of TRU waste at the WIPP facility and followed by a period ranging from seven to ten (7-10) years for decontamination, decommissioning, and final closure. Assuming the first waste receipt occurs in July 1998, the Disposal Phase may extend until 2023, and so the latest expected year of final closure of the WIPP facility (i.e., date of final closure certification) would be 2033. If, as is currently projected, the WIPP facility is dismantled at closure, all surface and subsurface facilities (except the hot cell portion of the WHB, which will remain as an artifact of the Permanent Marker System [**PMS**]) will be disassembled and either salvaged or disposed in accordance with applicable standards. In addition, asphalt and crushed caliche that was used for paving will be removed, and the area will be recontoured and revegetated in accordance with a land management plan. A detailed closure schedule will be submitted in writing to the Secretary of the NMED, along with the notification of closure. Throughout the closure period, all necessary steps will be taken to prevent threats to human health and the environment in compliance with all applicable Resource Conservation and Recovery Act (**RCRA**) permit requirements. Figure I-3 presents the best estimate of a final facility closure schedule.

The schedule for final facility closure is considered to be a best estimate because closure of the facility is driven by policies and practices established for the decontamination, if necessary, and decommissioning of radioactively contaminated facilities. These required activities include extensive radiological contamination surveys and hazardous constituent surveys using, among other techniques, radiological surveys to indicate potential hazardous waste releases. Both types of surveys will be performed at all areas of the WIPP site where hazardous waste were managed. These surveys, along with historical radiological survey records, will provide the basis for release of structures, equipment, and components for disposal or decontamination for release off site. Specifications will be developed for each structure to be removed. A cost benefit analysis will be needed to evaluate decontamination options if extensive decontamination is necessary. Individual equipment surveys, structure surveys, and debris surveys will be required prior to disposition. Size-reduction techniques may be required to dispose of mixed or radioactive waste at the WIPP site. Current DOE policy, as reflected in the WIPP facility Safety Analysis Report (**SAR**) (DOE 1997), requires the preparation of a final decommissioning and decontamination (**D&D**) plan immediately prior to final facility closure. In this way, the specific conditions of the facility at the time D&D is initiated will be addressed. Section I-1e(2) provides a more detailed discussion of final facility closure activities.

Figure I-3 shows the schedule for the final facility closure consisting of decontamination, as needed, of the TRU waste-handling equipment, and of the aboveground equipment and facilities, including closure of surface HWMUs; decontamination of the shaft and haulage ways;

collected as part of the closure activities (such as those during which wipes were used to sample the containers and equipment for potential radioactive contamination or those involving solidified decontamination solutions, the handling of equipment designated for disposal, and the handling of residues collected as a result of spill cleanup). Derived wastes collected during the operation and closure of the WIPP facility will be identified and managed as TRU mixed wastes. These wastes will be disposed in the active underground HWDU. D&D derived wastes and equipment designated for disposal will be placed in the last underground HWDU panel before closure of that unit.

Surface Container Storage Units

The procedures employed for waste receipt at the WIPP facility minimize the likelihood for any waste spillage to occur outside the WHB. TRU mixed waste is shipped to the WIPP facility in approved shipping containers (i.e., Contact-Handled or Remote-Handled Packages) that are not opened until they are inside the WHB. Therefore, it is unlikely that soil in the Parking Area Unit or elsewhere in the vicinity of the WHB will become contaminated with TRU mixed waste constituents as a result of TRU mixed waste management activities. An evaluation of the soils in the vicinity of the WHB will only be necessary if a documented event resulting in a release has occurred outside the WHB.

The "Start Clean—Stay Clean" operating philosophy of the WIPP Project will minimize the need for decontamination of the WHB during decommissioning and closure. Procedures for opening shipping containers in the WHB limit the opportunity for waste spillage.

Should the need for decontamination of the WHB arise, the following methods may be employed, as appropriate, for the hazardous constituent/contaminant type and extent:

- Chemical cleaning (e.g., water, mild detergent cleanser, and polyvinyl alcohol)
- Nonchemical cleaning (e.g., sandblasting, grinding, high-pressure water spray, scabbler pistons and needle scalers, ice-blast technology, dry-ice blasting)
- Removal of contaminated components such as pipe and ductwork

Waste generated as a result of WHB decontamination activities will be managed as derived waste in accordance with applicable permit requirements and will be emplaced in the last open underground HWDU for disposal.

Waste Handling Equipment and

The waste ~~hoist~~ shaft conveyance and associated waste handling equipment will be decontaminated to background or be disposed as derived waste as part of both contingency and final facility closure. Procedures for detection and sampling will be as described above. Equipment cleanup will be as above using chemical or nonchemical techniques.

TABLE I-1
ANTICIPATED EARLIEST CLOSURE DATES FOR THE UNDERGROUND HWDUs

HWDU	OPERATIONS START	OPERATIONS END	CLOSURE START	CLOSURE END
PANEL 1	3/99	2/03	3/03	9/03 SEE NOTE 5
PANEL 2	3/03	6/05	7/05	1/06 SEE NOTE 5
PANEL 3	7/05	1/07	2/07	8/07 SEE NOTE 6
PANEL 4	1/07	1/09	2/09	8/09 SEE NOTE 6
PANEL 5	1/09	1/11	2/11	8/11 SEE NOTE 6
PANEL 6	1/11	1/13	2/13	8/13 SEE NOTE 6
PANEL 7	1/13	1/15	2/15	8/15 SEE NOTE 6
PANEL 8	1/15	1/17	2/17	8/17
PANEL 9	1/17	1/28	2/28	SEE NOTE 4
PANEL 10	1/28	9/30	10/30	SEE NOTE 4

NOTE 1: Only Panels 1 to 4 will be closed under the initial term of this permit. Closure schedules for Panels 5 through 10 are projected assuming new permits will be issued in 2009 and 2019.

NOTE 2: The point of closure start is defined as sixty (60) days following notification to the NMED of closure.

NOTE 3: The point of closure end is defined as one hundred eighty (180) days following placement of final waste in the panel.

NOTE 4: The time to close these areas may be extended depending on the nature and extent of the disturbed rock zone. The excavations that constitute these panels will have been opened for as many as forty (40) years so that the preparation for closure may take longer than the time allotted in Figure I-2. If this extension is needed, it will be requested as an amendment to the Closure Plan.

NOTE 5: The anticipated closure end date for Panels 1 and 2 is for installation of the 12-foot explosion-isolation wall. Final closure of Panels 1 and 2 will be completed as specified in this Permit no later than ~~June 30, 2009~~ January 31, 2016.

NOTE 6: The anticipated closure end date for Panels 3 through 7 is for initially blocking ventilation through the ~~closed~~ filled panel. Final closure of Panels 3 through 7 will be completed as specified in this Permit no later than ~~June 30, 2009~~ January 31, 2016.

Contents

A2.5~~5~~6.2 Material Characteristics

Fill can utilize material that was excavated during shaft sinking and stored at the WIPP site, or a borrow pit may be excavated to secure fill material. The bulk fill material may include bentonite additive, if deemed appropriate.

A2.5~~5~~6.3 Construction

Dynamic compaction is specified for the clay column in the Dewey Lake Formation because of its perceived expediency. Vibratory compaction will be used near surface when there is no longer space for the three stage construction deck.

A2.5~~5~~6.4 Performance Requirements

Care will be taken to compact the earthen fill with an energy of twice Modified Proctor energy, which has been shown to produce a dense, uniform fill.

A2.5~~5~~6.6 Verification

Materials placed will be documented, with density measurements as appropriate.

A3. Concluding Remarks

Material specifications in this appendix provide descriptions of seal materials along with reasoning about why they are expected to function well in the WIPP setting. The specification follows a framework that states the function of the seal component, a description of the material, and a summary of construction techniques that could be implemented without resorting to extensive development efforts. Discussion of performance requirements for each material is the most detailed section because design of the seal system requires analysis of performance to ascertain compliance with regulations. Successful design of the shaft seal system is demonstrated by an evaluation of how well the design performs, rather than by comparison with a predetermined quantity.

Materials chosen for use in the shaft seal system have several common desirable attributes: low permeability, availability, high density, longevity, low cost, constructability, and supporting documentation. Functional redundancy using different materials provides an economically and technologically feasible shaft seal system that limits fluid transport.

arrangement reduces the potential for puncture accidents. Facility pallets may also be moved by facility transfer vehicles. WIPP facility operational documents define the operational load of the facility pallet to ensure that the rated load of a facility pallet is not exceeded.

Containment pallets are fabricated units having a containment capacity of at least ten percent of the volume of the containers and designed to support a minimum of either a single drum, a single SWB or a single TDOP. The pallets will have a rated load capacity of equal to or greater than the gross weight limit of the container(s) to be supported on the pallet. Loads are secured to the containment pallet during transport. A typical containment pallet is shown in Figure M1-10a. Fork pockets in the side of the pallet allow the containment pallet to be lifted and transferred by forklift. WIPP facility operational documents define the operational load of the containment pallet to assure that the rated load of a containment pallet is not exceeded.

Facility Transfer Vehicle

The facility transfer vehicle is a battery or electric powered automated vehicle that either operates on tracks or has an on-board guidance system that allows the vehicle to operate on the floor of the WHB. An integrated or removable roller bed will be used to move pallets on and off the vehicle. It is designed with a flat bed that has adjustable height capability and will transfer waste payloads on facility pallets to the storage areas be used to transfer the facility pallets on or off the pallet support stands in the waste ~~hoist cage~~ shaft conveyance by raising and lowering the bed (see Figure M1-11).

RH TRU Mixed Waste

The RH TRU mixed waste is handled and stored in the RH Complex of the WHB Unit which comprises the following locations: RH Bay (12,552 ft^2 (1,166 m^2)), the Cask Unloading Room (382 ft^2 (36 m^2)), the Hot Cell (1,841 ft^2 (171 m^2)), the Transfer Cell (1,003 ft^2 (93 m^2)) (Figures M1-17a, b and c), and the Facility Cask Loading Room (1,625 ft^2 (151 m^2)) (Figure M1-17d).

The RH Bay (Figure M1-14a) is a high-bay area for receiving casks and subsequent handling operations. The trailer carrying the RH-TRU 72-B or CNS 10-160B shipping cask (Figures M1-18, M1-19, M1-20 and M1-21) enters the RH Bay through a set of double doors on the east side of the WHB. The RH Bay houses the Cask Transfer Car. The RH Bay is served by the RH Bay Overhead Bridge Crane used for cask handling and maintenance operations. Storage in the RH Bay occurs in the RH-TRU 72-B or CNS 10-160B casks. The storage occurs after the trailer containing the cask is moved into the RH Bay and prior to moving the cask into the Cask Unloading Room to stage the waste for disposal operations. A maximum of two loaded casks and one 55-gallon drum for derived waste (156 ft^3 (4.4 m^3)) may be stored in the RH Bay.

The Cask Unloading Room (Figure M1-17a) provides for transfer of the RH-TRU 72-B cask to the Transfer Cell, or the transfer of drums from the CNS 10-160B cask to the Hot Cell. Storage in the Cask Unloading Room will occur in the RH-TRU 72-B or CNS 10-160B casks. Storage in this area typically occurs at the end of a shift or in an off-normal event that results in the suspension of waste handling operations. A maximum of one cask (74 ft^3 (2.1 m^3)) may be stored in the Cask Unloading Room.

The Hot Cell (Figure M1-17b) is a concrete shielded room in which drums of RH TRU mixed waste will be transferred remotely from the CNS 10-160B cask, staged in the Hot Cell, and loaded into a Facility Canister. The loaded Facility Canister is then lowered from the Hot Cell into the Transfer Cell Shuttle Car containing a Shielded Insert. Storage in the Hot Cell occurs in either drums or Facility Canisters. Drums that are stored are either on the drum carriage unit that was removed from the CNS 10-160B cask or in a Facility Canisters. A maximum of 12 55-gallon drums and one 55-gallon drum for derived waste (94.9 ft^3 (2.7 m^3)) may be stored in the Hot Cell.

The Transfer Cell (Figure M1-17c) houses the Transfer Cell Shuttle Car, which moves the RH-TRU 72-B cask or Shielded Insert into position for transferring the canister to the Facility Cask. Storage in this area typically occurs at the end of a shift or in an off-normal event that results in the suspension of a waste handling evolution. A maximum of one canister (31.4 ft^3 (0.89 m^3)) may be stored in the Transfer Cell in the Transfer Cell Shuttle Car.

The Facility Cask Loading Room (Figure M1-17d) provides for transfer of a canister to the Facility Cask for subsequent transfer to the waste ~~hoist~~ shaft conveyance and to the Underground Hazardous Waste Disposal Unit (**HWDU**). The Facility Cask Loading Room also functions as an air lock between the Waste Shaft and the Transfer Cell. Storage in this area typically occurs at the end of a shift or in an off-normal event that results in the suspension of waste handling operations. A maximum of one canister (31.4 ft^3 (0.89 m^3)) may be stored in the Facility Cask (Figure M1-23) in the Facility Cask Loading Room.

Following is a description of major pieces of equipment that are used to manage RH TRU mixed waste in the WHB Unit. A summary of equipment capacities, as required by 20.4.1.500 NMAC, is included in Table M1-3.

Casks

The RH-TRU 72-B cask (Figure M1-20) is a cylinder designed to meet U.S. Department of Transportation (**DOT**) Type B shipping container requirements. It consists of a separate inner vessel within a stainless steel, lead-shielded outer cask protected by impact limiters at each end, made of stainless steel skins filled with polyurethane foam. The inner vessel is made of stainless steel and provides an internal containment boundary and a cavity for the payload. Neither the outer cask nor the inner vessel is vented. Payload capacity of each RH-TRU 72-B shipping cask is 8,000 lbs (3,628 kg). The payload consists of a canister of RH TRU mixed waste, which may contain up to 31.4 ft^3 (0.89 m^3) of directly loaded waste or waste in smaller containers.

The CNS 10-160B cask (Figure M1-21) is designed to meet DOT Type B container requirements and consists of two carbon steel shells and a lead shield, welded to a carbon steel bottom plate. A 12-gauge stainless steel thermal shield surrounds the cask outer shell, which is equipped with two steel-encased, rigid polyurethane foam impact limiters attached to the top and bottom of the cask. The CNS 10-160B cask is not vented. Payload capacity of each CNS 10-160B cask is 14,500 lbs (6,577 kg). The payload consists of up to ten 55-gallon drums.

they are in good condition prior to storage. Waste containers will also be checked for external surface contamination. If a primary waste container is not in good condition, the Permittees will overpack the container, repair/patch the container in accordance with 49 CFR §173 and §178 (e.g., 49 CFR §173.28), or return the container to the generator.

For inventory control purposes, TRU mixed waste container identification numbers will be verified against the Uniform Hazardous Waste Manifest and the WWIS. Inconsistencies will be resolved with the generator before TRU mixed waste is emplaced. Discrepancies that are not resolved within 15 days will be reported to the NMED in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.72).

Each facility pallet has two recessed pockets to accommodate two sets of 7-packs, two sets of 4-packs, two sets of 3-packs, or two SWBs stacked two-high, two TDOPs, or any combination thereof. Each stack of waste containers will be secured prior to transport underground (see Figure M1-10). A forklift or the facility transfer vehicle will transport the loaded facility pallet to the conveyance loading room located adjacent to the Waste Shaft. The conveyance loading room serves as an air lock between the CH Bay and the Waste ~~Hoist~~ Shaft, preventing excessive air flow between the two areas. The facility transfer vehicle will be driven onto the waste ~~hoist~~ shaft conveyance deck, where the loaded facility pallet will be transferred to the waste ~~hoist~~ shaft conveyance, and the facility transfer vehicle will be backed off. Containers of CH TRU mixed waste (55-gal (208 L) drums, SWBs, 85-gal (321 L) drums, 100-gal (379-L) drums, and TDOPs) can be handled individually, if needed, using the forklift and lifting attachments (i.e., drum handlers, parrot beaks).

The waste ~~hoist~~ shaft conveyance will lower the loaded facility pallet to the Underground HWDUs. Figure M1-13 is a flow diagram of the CH TRU mixed waste handling process.

M1-1d(3) RH TRU Mixed Waste Handling

The RH TRU mixed waste will be received in the RH-TRU 72-B cask or CNS 10-160B cask loaded on a trailer, as illustrated in process flow diagrams in Figures M1-26 and M1-27, respectively. These are shown schematically in Figures M1-28 and M1-29. Upon arrival at the gate, external radiological surveys, security checks, shipping documentation reviews are performed and the Uniform Hazardous Waste Manifest is signed. The generator's copy of the Uniform Hazardous Waste Manifest is returned to the generator. Should the results of the contamination survey exceed acceptable levels, the shipping cask and transport trailer remain outside the WHB in the Parking Area Unit, and the appropriate radiological boundaries (i.e., ropes, placards) are erected around the shipping cask and transport trailer. A determination will be made whether to return the cask to the originating site or to decontaminate the cask.

Following cask inspections, the shipping cask and trailer are moved into the RH Bay or held in the Parking Area Unit. The waste handling process begins in the RH Bay where the impact limiter(s) are removed from the shipping cask while it is on the trailer. Additional radiological surveys are conducted on the end of the cask previously protected by the impact limiter(s) to verify the absence of contamination. The cask is unloaded from the trailer using the RH Bay Overhead Bridge Crane and placed on a Cask Transfer Car.

Transfer of Disposal Canister into the Facility Cask

The transfer of a canister into the Facility Cask from the Transfer Cell is monitored by closed-circuit television cameras. The Transfer Cell Shuttle Car positions the RH-TRU 72-B cask or Shielded Insert under the Facility Cask Loading Room port and the shield valve is opened. Then the remotely operated 6.25 Ton Grapple Hoist attaches to the canister, and the canister is lifted through the open shield valve into the vertically-oriented Facility Cask located on the Cask Transfer Car in the Facility Cask Loading Room. During this cask-to-cask transfer, the telescoping port shield is in contact with the underside of the Facility Cask to assure shielding continuity, as does the shield bell located above the Facility Cask.

For canisters received at the WIPP from the generator site in a RH-TRU 72-B cask, the identification number is verified using cameras, which also provide images of the canister surfaces during the lifting operation. Identification numbers are verified against the WWIS. If there are any discrepancies, the canister is returned to the RH-TRU 72-B cask, returned to the Parking Area ~~Staging Area~~ Unit, and the generator is contacted for resolution. Discrepancies that are not resolved within 15 days will be reported to the NMED as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.72). As the canister is being lifted from the RH-TRU 72-B cask into the Facility Cask, additional swipe samples may be taken.

Transfer of the Canister to the Underground

When the canister is fully within the Facility Cask, the lower shield valve is closed. The 6.25 Ton Grapple Hoist detaches from the canister and is raised until the 6.25 Ton Grapple Hoist clears the Facility Cask, at which time the upper shield valve is closed. The 6.25 Ton Grapple Hoist and shield bell are then raised clear of the Facility Cask, and the telescoping port shield is retracted. The Facility Cask Rotating Device rotates the Facility Cask until it is in the horizontal position on the Facility Cask Transfer Car. The shield doors on the Facility Cask Loading Room are opened, and the facility Cask Transfer Car moves onto the waste ~~hoist~~ shaft conveyance and is lowered to the waste Shaft Station underground. At the waste Shaft Station underground, the Facility Cask Transfer Car moves the Facility Cask from the waste ~~hoist~~ shaft conveyance. A forklift is used to remove the Facility Cask from the Facility Cask Transfer Car and to transport the Facility Cask to the Underground HWDU.

Returning the Empty Cask

The empty RH-TRU 72-B cask or Shielded Insert is returned to the RH Bay by reversing the process. In the RH Bay, swipe samples are collected from inside the empty cask. If necessary, the inside of the cask is decontaminated. The RH-TRU 72-B cask lids are replaced, and the cask is replaced on the trailer using the RH Bay Bridge Crane. The impact limiters are replaced, and the trailer and the RH-TRU 72-B cask are then moved out of the RH Bay. The Shielded Insert is stored in the RH Bay until needed.

M1-1e Inspections

Inspection of containers and container storage area are required by 20.4.1.500 NMAC (incorporating 40 CFR §264.174). These inspections are described in this section.

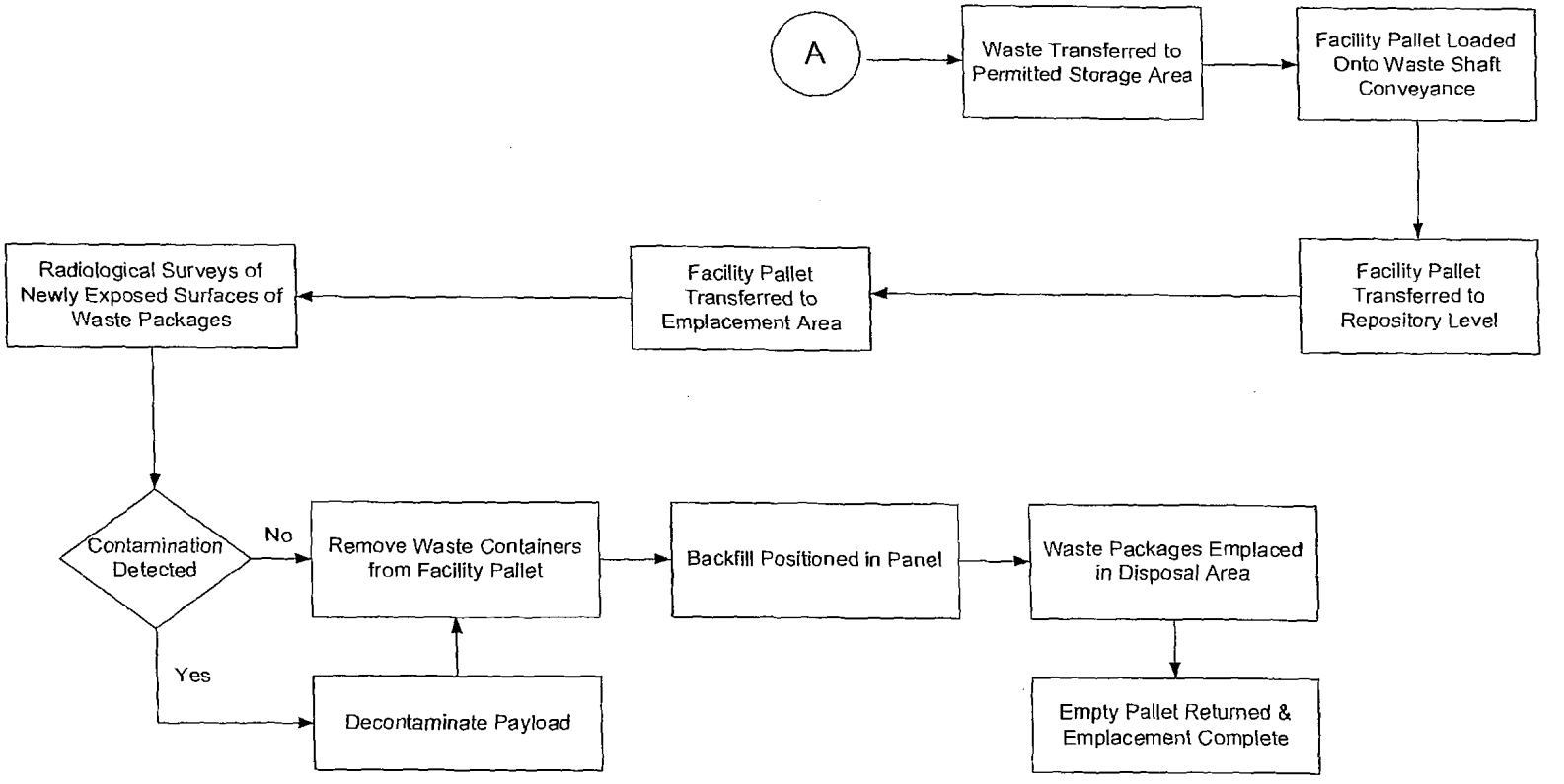


Figure M1-13
WIPP Facility Surface and Underground CH Transuranic Mixed Waste Process Flow Diagram (Continued)

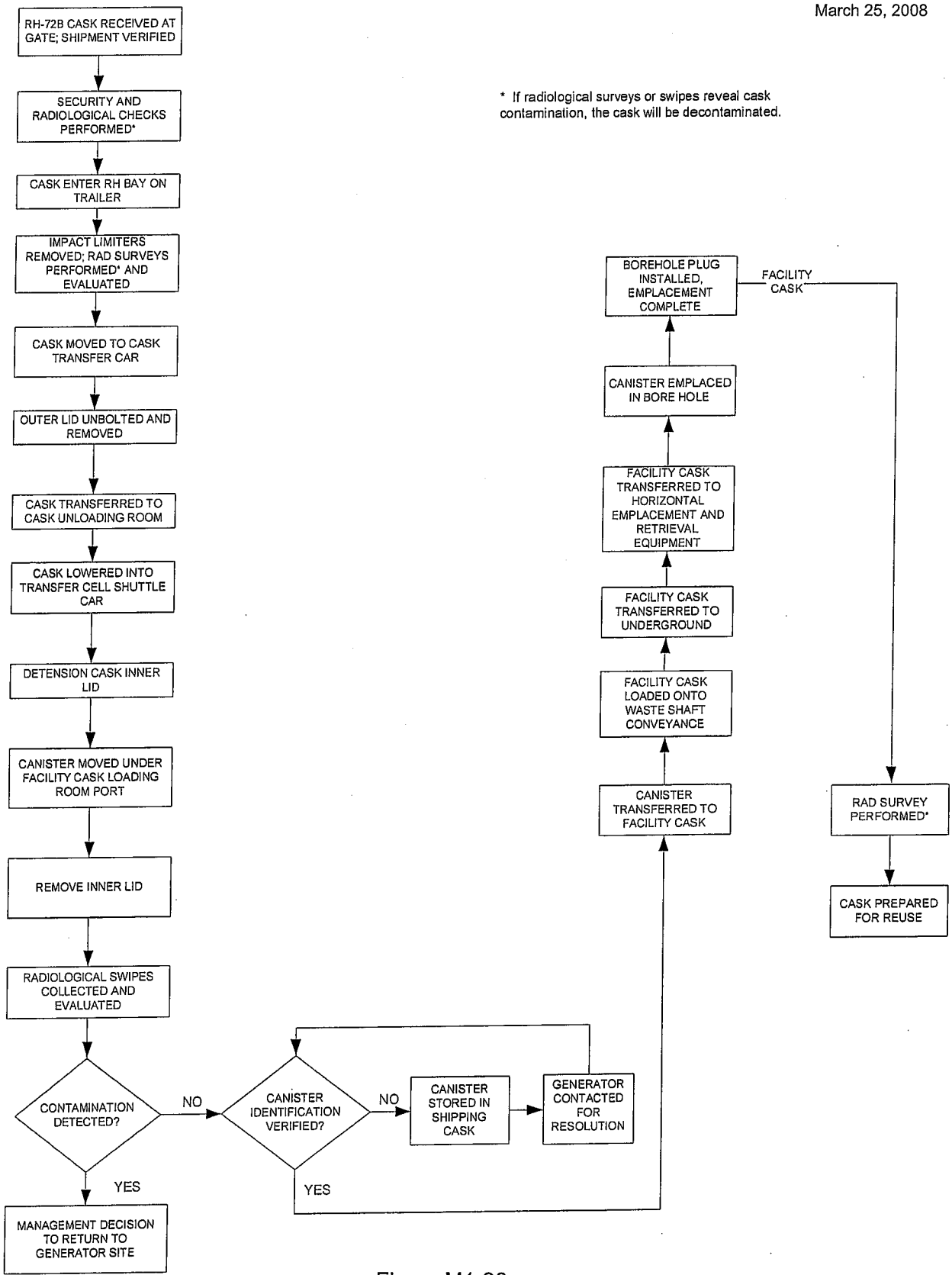


Figure M1-26
Surface and Underground RH Transuranic Mixed Waste Process Flow Diagram for RH-TRU 72-B Shipping Cask

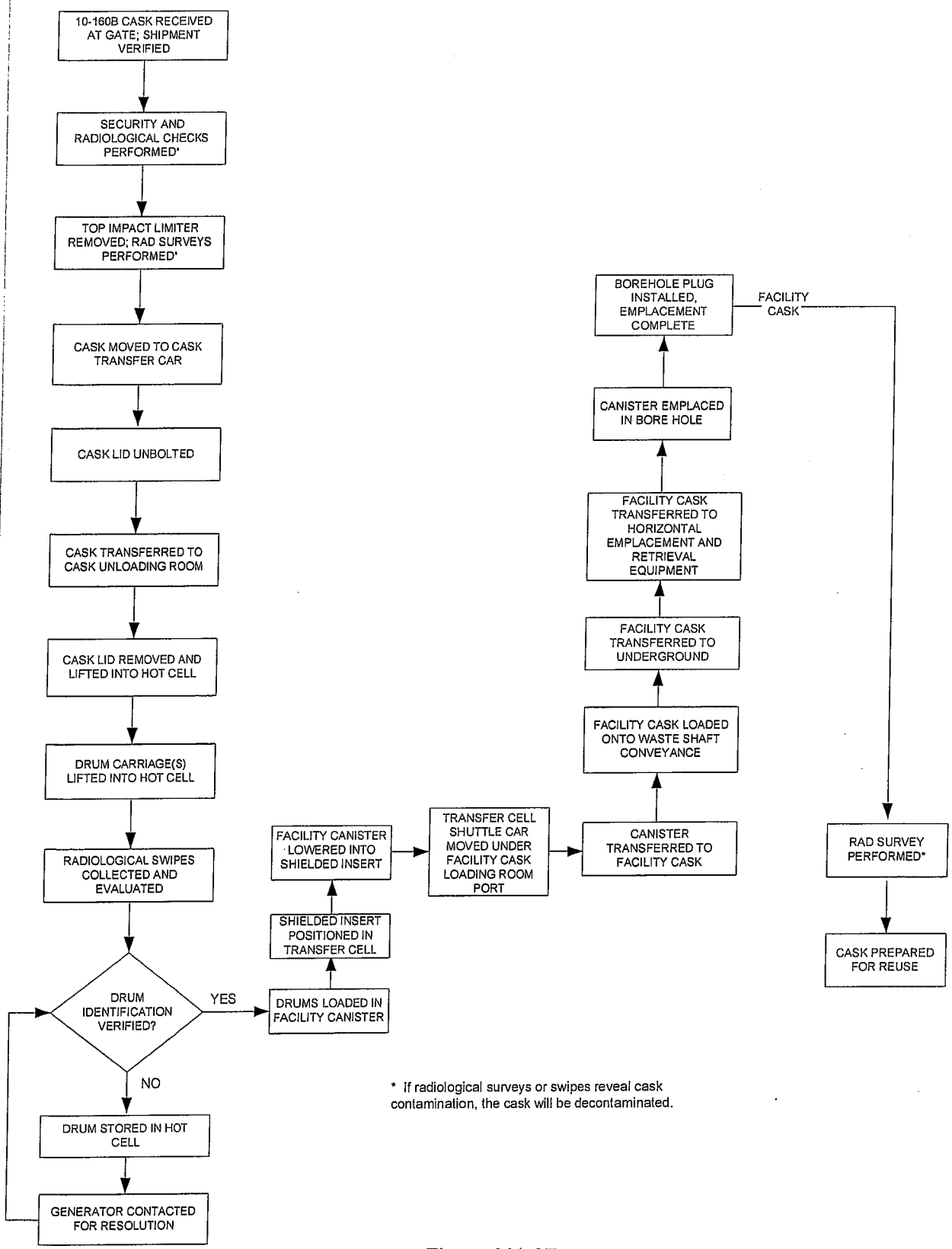


Figure M1-27
Surface and Underground RH Transuranic Mixed Waste Process Flow Diagram for CNS 10-160B Shipping Cask

ATTACHMENT M2

GEOLOGIC REPOSITORY

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measured and then compared to the VOC concentration of concern as required by Permit Module IV.

Four shafts connect the underground area with the surface. The Waste Shaft Conveyance headframe and hoist are located within the Waste Handling Building (**WHB**) and will be used to transport containers of TRU mixed waste, equipment, and materials to the repository horizon. The waste hoist can also be used to transport personnel. The Air Intake Shaft and the Salt Handling Shaft provide ventilation to all areas of the mine except for the Waste Shaft Station. This area is ventilated by the Waste Shaft itself. The Salt Handling Shaft is also used to hoist mined salt to the surface and serves as the principal personnel transport shaft. The Exhaust Shaft serves as a common exhaust air duct for all areas of the mine. The relationship between the WIPP surface facility, the four shafts, and the geologic repository horizon is shown on Figure M2-2.

The HWDUs identified as Panels 1 through 7 (Figure M2-1) provide room for up to 4,582,750 cubic feet (ft^3) (129,750 meters (m^3)) of CH TRU mixed waste. The CH TRU mixed waste containers (typically, 7-packs and standard waste boxes (**SWBs**)) may be stacked three-high across the width of the room.

Panels 4 through 7 provide room for up to 70,100 ft^3 (1,985 m^3) of RH TRU mixed waste. RH TRU mixed waste may be disposed of in up to 730 boreholes per panel. At a minimum, these boreholes shall be drilled on nominal eight-foot centers, horizontally, about mid-height in the ribs of a disposal room. The thermal loading from RH TRU mixed waste shall not exceed 10 kilowatts per acre when averaged over the area of a panel, as shown in Permit Attachment M3, plus one hundred feet of each of a Panel's adjoining barrier pillars.

Detailed studies and evaluations of the natural environmental setting of the repository area have been part of the site selection and characterization process. Detailed information regarding the climatic, geologic, and hydrologic characteristics of the WIPP facility and local vicinity was provided in Section D-9a, and numerous Chapter D Appendices, of the WIPP RCRA Part B Permit Application (DOE, 1997).

The WIPP facility is located in a sparsely populated area with site conditions favorable to isolation of TRU mixed waste from the biosphere. Geologic and hydrologic characteristics of the site related to its TRU mixed waste isolation capabilities are discussed in Section D-9a(1) of the WIPP RCRA Part B Permit Application (DOE, 1997). Hazard prevention programs are described in Permit Attachment E. Contingency and emergency response actions to minimize impacts of unanticipated events, such as spills, are described in Permit Attachment F. The closure plan for the WIPP facility is described in Permit Attachment I.

M2-2 Geologic Repository Design and Process Description

M2-2a Geologic Repository Design and Construction

The WIPP facility, when operated in compliance with the Permit, will ensure safe operations and be protective of human health and the environment.

techniques and equipment and eliminates operational problems such as dust creation and introducing additional equipment and operations into waste handling areas. There are no mine operational considerations (e.g. ventilation flow and control) when backfill is placed in this manner.

The Waste ~~Hoist~~ Shaft Conveyance

The hoist systems in the shafts and all shaft furnishings are designed to resist the dynamic forces of the hoisting system and to withstand a design-basis earthquake of 0.1 g. Appendix D2 of the WIPP RCRA Part B Permit Application (DOE, 1997) provided engineering design-basis earthquake report which provides the basis for seismic design of WIPP facility structures. The waste hoist is equipped with a control system that will detect malfunctions or abnormal operations of the hoist system (such as overtravel, overspeed, power loss, circuitry failure, or starting in a wrong direction) and will trigger an alarm that automatically shuts down the hoist.

The waste hoist ~~operates in~~ moves the Waste Shaft Conveyance and is a multirope, friction-type hoist. A counterweight is used to balance the waste ~~hoist~~ shaft conveyance. The waste ~~hoist~~ shaft conveyance (outside dimensions) is 30 ft (9 m) high by 10 ft (3 m) wide by 15 ft (4.5 m) deep and can carry a payload of 45 tons (40,824 kg). During loading and unloading operations, it is steadied by fixed guides. The hoist's maximum rope speed is 500 ft (152.4 m) per min.

The Waste Shaft hoist system has two sets of brakes, with two units per set, plus a motor that is normally used to stop the hoist. The brakes are designed so that either set, acting alone, can stop a fully loaded conveyance under all emergency conditions.

The Underground Waste Transporter

The underground waste transporter is a commercially available diesel-powered tractor. The trailer was designed specifically for the WIPP for transporting facility pallets from the waste ~~hoist~~ shaft conveyance to the Underground HWDU in use. This transporter is shown in Figure M2-6.

Underground Forklifts

CH TRU mixed waste containers loaded on slipsheets will be removed from the facility pallets using forklifts with a push-pull attachment (Figure M2-7) attached to the forklift-truck front carriage. The push-pull attachment grips the edge of the slipsheet (on which the waste containers sit) to pull the containers onto the platen. After the forklift moves the waste containers to the emplacement location, the push-pull attachment pushes the containers into position. The use of the push-pull attachment prevents direct contact between waste containers and forklift tines. SWBs and TDOPs may also be removed from the facility pallet by using forklifts equipped with special adapters for these containers. These special adapters will prevent direct contact between SWBs or TDOPs and forklift tines. In addition, the low clearance forklift that is used to emplace MgO may be used to emplace waste if necessary.

The Facility Cask Transfer Car

The Facility Cask Transfer Car is a self-propelled rail car (Figure M2-14) that operates between the Facility Cask Loading Room and the geologic repository. After the Facility Cask is loaded, the Facility Cask Transfer Car moves onto the waste ~~hoist~~ shaft conveyance and is then transported underground. At the underground waste shaft station, the Facility Cask Transfer Car proceeds away from the waste ~~hoist~~ shaft conveyance to provide forklift access to the Facility Cask.

Horizontal Emplacement and Retrieval Equipment

The Horizontal Emplacement and Retrieval Equipment (**HERE**) (Figure M2-15) emplaces canisters into a borehole in a room wall of an Underground HWDU. Once the canisters have been emplaced, the HERE then fills the borehole opening with a shield plug.

M2-2b Geologic Repository Process Description

Prior to receipt of TRU mixed waste at the WIPP facility, waste operators will be thoroughly trained in the safe use of TRU mixed waste handling and transport equipment. The training will include both classroom training and on-the-job training.

RH TRU Mixed Waste Emplacement

The Facility Cask Transfer Car is loaded onto the waste ~~hoist~~ shaft conveyance and is lowered to the waste shaft station underground. At the waste shaft station underground, the Facility Cask is moved from the waste ~~hoist~~ shaft conveyance by the Facility Cask Transfer Car (Figure M2-16). A forklift is used to remove the Facility Cask from the Facility Cask Transfer Car and to transport the Facility Cask to the Underground HWDU. There, the Facility Cask is placed on the HERE (Figure M2-17). The HERE is used to emplace the RH TRU mixed waste canister into the borehole. The borehole will be visually inspected for obstructions prior to aligning the HERE and emplacement of the RH TRU mixed waste canister. The Facility Cask is moved forward to mate with the shield collar, and the transfer carriage is advanced to mate with the rear Facility Cask shield valve. The shield valves on the Facility Cask are opened, and the transfer mechanism advances to push the canister into the borehole. After retracting the transfer mechanism into the Facility Cask, the forward shield valve is closed, and the transfer mechanism is further retracted into its housing. The transfer mechanism is moved to the rear, and the shield plug carriage containing a shield plug is placed on the emplacement machine. The transfer mechanism is used to push the shield plug into the Facility Cask. The front shield valve is opened, and the shield plug is pushed into the borehole (Figure M2-18). The transfer mechanism is retracted, the shield valves close on the Facility Cask, and the Facility Cask is removed from the HERE.

A shield plug is a concrete filled cylindrical steel shell (Figure M2-21) approximately 61 in. long and 29 in. in diameter, made of concrete shielding material inside a 0.24 in. thick steel shell with a removable pintle at one end. Each shield plug has integral forklift pockets and weighs approximately 3,750 lbs. The shield plug is inserted with the pintle end closest to the HERE to provide the necessary shielding , limiting the borehole radiation dose rate at 30 cm to less than 10 mrem per hour for a canister surface dose rate of 100 rem/hr . Additional shielding is provided at the direction of the Radiological Control Technician based on dose rate surveys

following shield plug emplacement. This additional shielding is provided by the manual emplacement of one or more shield plug supplemental shielding plates and a retainer (Figures M2-19 and M2-20).

The amount of RH TRU mixed waste disposal in each panel is limited based on thermal and geomechanical considerations and shall not exceed 10 kilowatts per acre as described in Permit Attachment M2-1. RH TRU mixed waste emplacement boreholes shall be drilled in the ribs of the panels at a nominal spacing of 8 ft (2.4 m) center-to-center, horizontally.

Figures M1-26 and M1-27 are flow diagrams of the RH TRU mixed waste handling process for the RH-TRU 72-B and CNS 10-160B casks, respectively.

CH TRU Mixed Waste Emplacement

CH TRU mixed waste containers will arrive by tractor-trailer at the WIPP facility in sealed shipping containers (e.g., TRUPACT-IIs or HalfPACTs), at which time they will undergo security and radiological checks and shipping documentation reviews. The trailers carrying the shipping containers will be stored temporarily at the Parking Area Container Storage Unit (Parking Area Unit). A forklift will remove the Contact Handled Packages from the transport trailers and will transport them into the Waste Handling Building Container Storage Unit for unloading of the waste containers. Each TRUPACT-II may hold up to two 7-packs, two 4-packs, two 3-packs, two SWBs, or one TDOP. Each HalfPACT may hold up to seven 55-gal (208 L) drums, one SWB, or four 85-gal (321 L) drums. An overhead bridge crane will be used to remove the waste containers from the Contact Handled Packaging and place them on a facility or containment pallet. Each facility pallet has two recessed pockets to accommodate two sets of 7-packs, two sets of 3-packs, two sets of 4-packs, two SWBs stacked two-high, or two TDOPs. Each stack of waste containers will be secured prior to transport underground (see Figure M2-3). A forklift or the facility transfer vehicle will transport the loaded facility pallet to the conveyance loading room adjacent to the Waste Shaft. The facility transfer vehicle will be driven onto the waste ~~hoist~~ shaft conveyance deck, where the loaded facility pallet will be transferred to the waste ~~hoist~~ shaft conveyance, and the facility transfer vehicle will be backed off. Containers of CH TRU mixed waste (55-gal (208 L) drums, SWBs, 85-gal (321 L) drums, 100-gal (379 L) drums, and TDOPs) can be handled individually, if needed, using the forklift and lifting attachments (i.e., drum handlers, parrot beaks).

The waste ~~hoist~~ shaft conveyance will lower the loaded facility pallet to the underground. At the waste shaft station, the CH TRU underground transporter will back up to the waste ~~hoist cage~~ shaft conveyance, and the facility pallet will be transferred from the waste ~~hoist~~ shaft conveyance onto the transporter (see Figure M2-6). The transporter will then move the facility pallet to the appropriate Underground HWDU for emplacement.

A forklift in the HWDU near the waste stack will be used to remove the waste containers from the facility pallets and to place them in the waste stack using a push-pull attachment. The waste will be emplaced room by room in Panels 1 through 7. Each panel will be closed off when filled. If a waste container is damaged during the Disposal Phase, it will be immediately overpacked or repaired. CH TRU mixed waste containers will be continuously vented. The filter vents will allow aspiration, preventing internal pressurization of the container and minimizing the buildup of flammable gas concentrations.

dilation of the immediate salt roof beam and possible bed separations along clay seams. Additional instrumentation will be installed as conditions warrant.

Remote polling of the geomechanical instrumentation will be performed at least once every month. This frequency may be increased to accommodate any changes that may develop.

The results from the remotely read instrumentation will be evaluated after each scheduled polling. Documentation of the results will be provided annually in the Geotechnical Analysis Report.

Data from remotely read instrumentation will be maintained as part of a geotechnical instrumentation system. The instrumentation system provides for data maintenance, retrieval, and presentation. The Permittees will retrieve the data from the instrumentation system and verify data accuracy by confirming the measurements were taken in accordance with applicable instructions and equipment calibration is known. Next, the Permittees will review the data after each polling to assess the performance of the instrument and of the excavation. Anomalous data will be investigated to determine the cause (instrumentation problem, error in recording, changing rock conditions). The Permittees will calculate various parameters such as the change between successive readings and deformation rates. This assessment will be reported to the Permittees' cognizant ground control engineer and operations personnel. The Permittees will investigate unexpected deformation to determine if remediation is needed.

The stability of an open panel excavation is generally determined by the rock deformation rate. The excavation may be unstable when there is a continuous increase in the deformation rate that cannot be controlled by the installed support system. The Permittees will evaluate the performance of the excavation. These evaluations assess the effectiveness of the roof support system and estimate the stand-up time of the excavation. If an open panel shows the trend is toward adverse (unstable) conditions, the results will be reported to determine if it is necessary to terminate waste disposal activities in the open panel. This report of the trend toward adverse conditions in an open HWDU will also be provided to the Secretary of the NMED within ~~5 working~~ seven (7) calendar days of issuance of the report.

M2-5b(2)(b) System Experience

Much experience in the use of geomechanical instrumentation was gained as the result of performance monitoring of Panel 1, which began at the time of completion of the panel excavation in 1988. The monitoring system installed at that time involved simple measurements and observations (e.g., vertical and horizontal convergence rates, and visual inspections). Minimal maintenance of instrumentation is required, and the instrumentation is easily replaced if it malfunctions. Conditions throughout Panel 1 are well known. The monitoring program continues to provide data to compare the performance of Panel 1 with that established elsewhere in the underground. Panel 1 performance is characterized by the following:

- The development of bed separations and lateral shifts at the interfaces of the salt and the clays underlying the anhydrites "a" and "b."

- Room closures. A closure due only to the roof movement will be separated from the total closure.

- The behavior of the pillars.
- Fracture development in the roof and floor.
- Distribution of load on the support system.

Roof conditions are assessed from observation boreholes and extensometer measurements. Measurements of room closure, rock displacements, and observations of fracture development in the immediate roof beam are made and used to evaluate the performance of a panel. A description of the Panel 1 monitoring program was presented to the members of the Geotechnical Experts Panel (in 1991) who concurred that it was adequate to determine deterioration within the rooms and that it will provide early warning of deteriorating conditions.

The assessment and evaluation of the condition of WIPP excavations is an interactive, continuous process using the data from the monitoring programs. Criteria for corrective action are continually reevaluated and reassessed based on total performance to date. Actions taken are based on these analyses and planned utilization of the excavation. Because WIPP excavations are in a natural geologic medium, there is inherent variability from point to point. The principle adopted is to anticipate potential ground control requirements and implement them in a timely manner rather than to wait until a need arises.

M2-5b(3) ~~Confirmatory~~ Volatile Organic Compound Monitoring

The ~~confirmatory~~ volatile organic compound monitoring for the WIPP Underground HWDUs will be conducted in accordance with Module IV and Permit Attachment N of this permit.

M2-5c Inspection

The inspection of the WIPP Underground HWDUs will be conducted in accordance with Module II and Permit Attachment D of this permit.

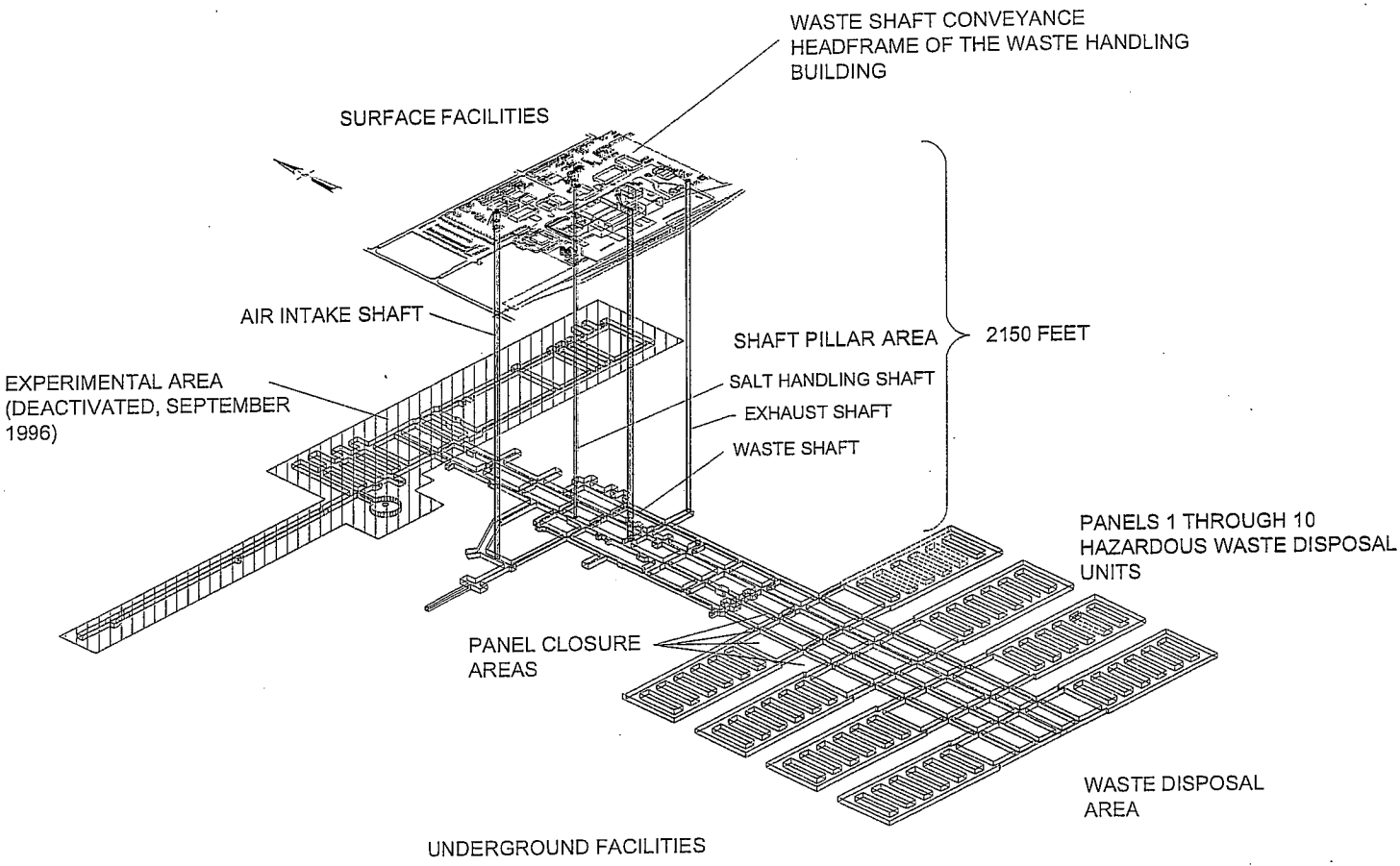

Figure M2-2
Spatial View of the Miscellaneous Unit and Waste Handling Facility

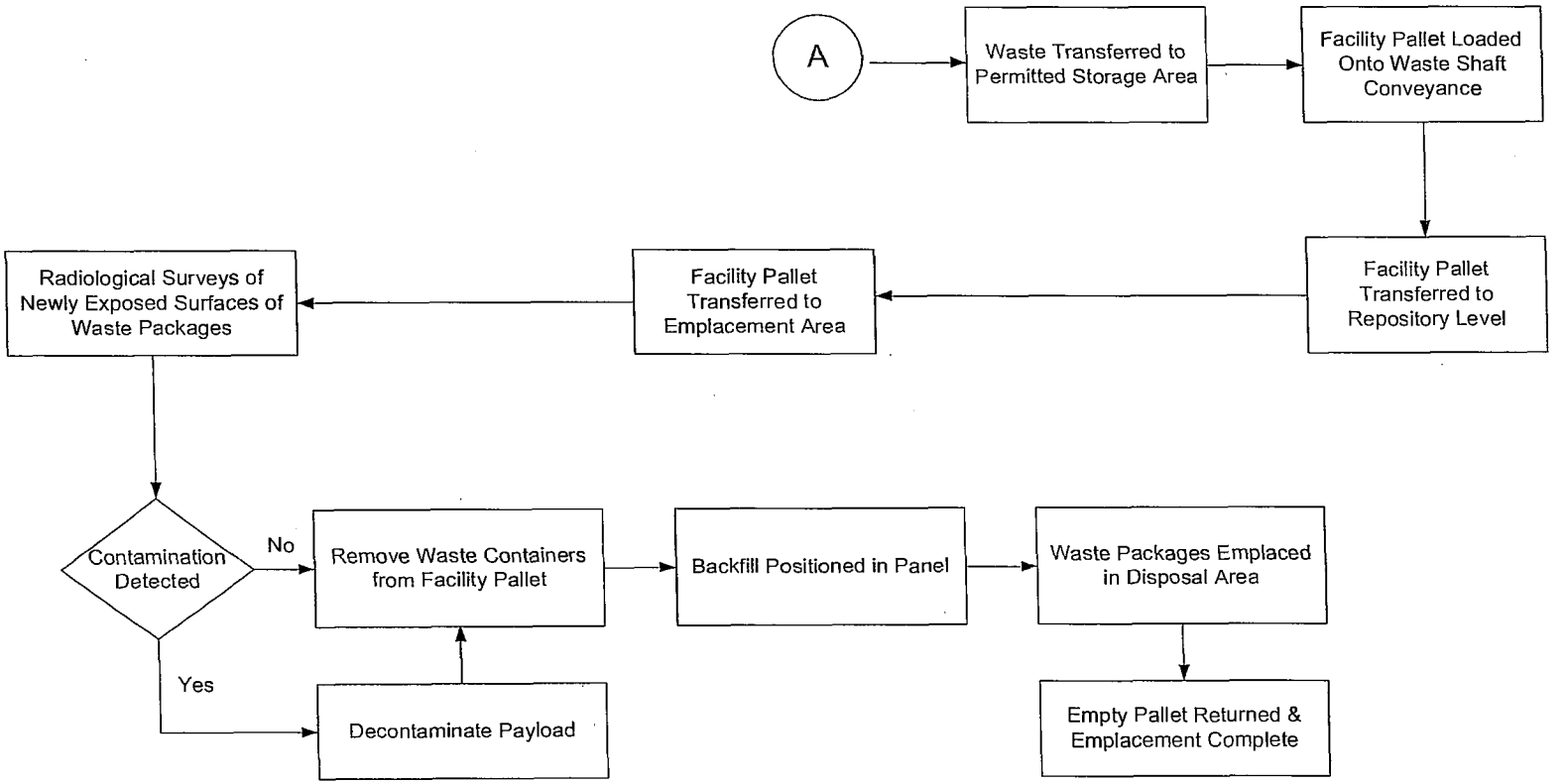

Figure M2-12
WIPP Facility Surface and Underground CH Transuranic Mixed Waste Process Flow Diagram
(Continued)

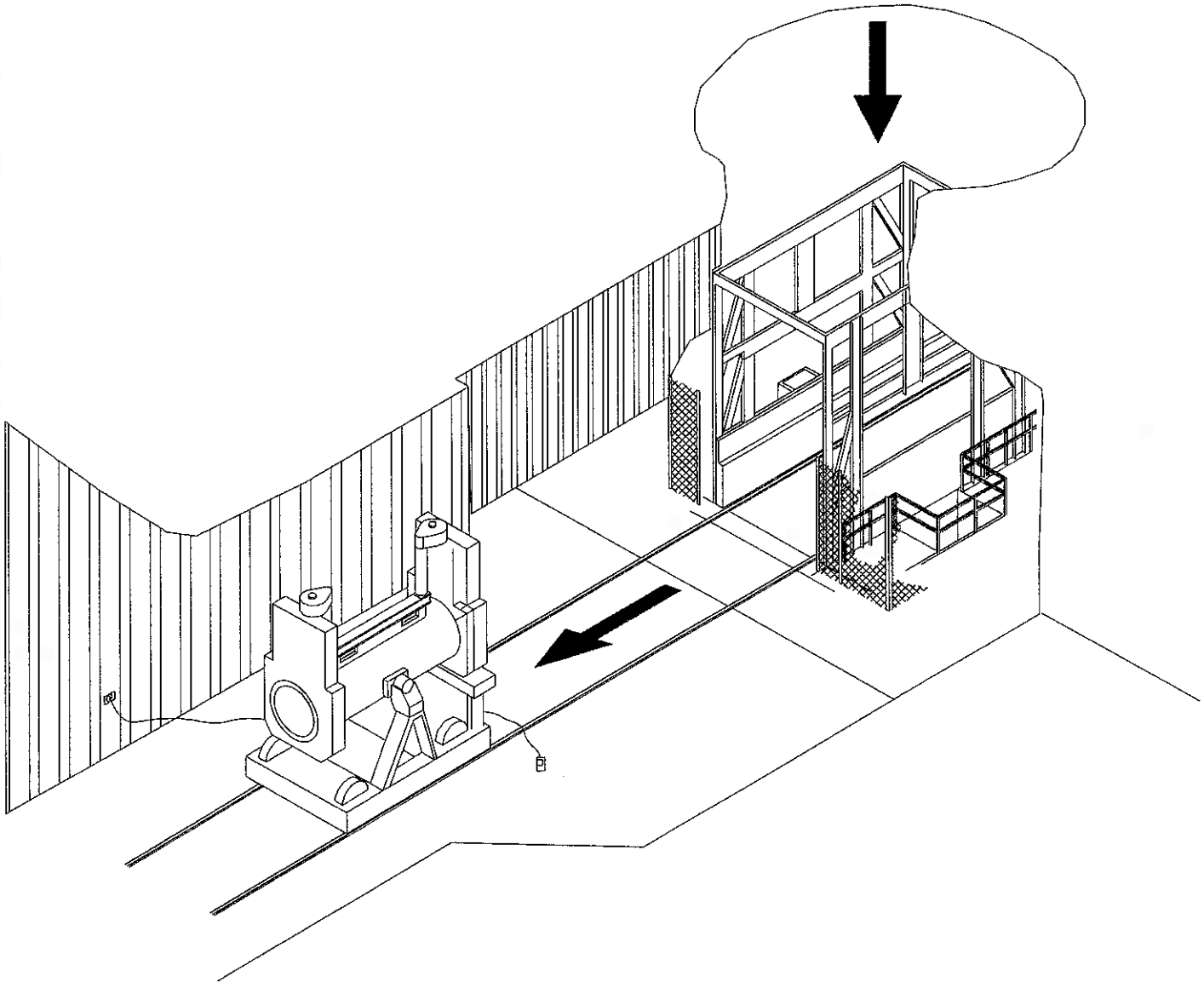

Figure M2-16
RH TRU Waste Facility Cask Unloading from Waste ~~Hoist~~ Shaft Conveyance

3. When the active disposal room is filled, another sample head will be installed to the inlet of the filled active disposal room. (Figure N-3 and N-4)

4. The exhaust drift bulkhead will be removed and re-installed in the next disposal room so disposal activities may proceed.

5. A ventilation barrier will be installed where the bulkhead was located in the active disposal room's exhaust drift. Another ventilation barrier will be installed in the active disposal room's air inlet drift, thereby closing that active disposal room.

6. Monitoring of VOCs will continue in the now closed disposal room. Monitoring of VOCs will occur in the active disposal room and all closed disposal rooms in which waste has been emplaced until commencement of panel closure activities (i.e., completion of ventilation barriers in Room 1).

This sequence for installing sample locations will proceed in the remaining disposal rooms until the inlet air ventilation barrier is installed in disposal room one. An inlet sampler will not be installed in disposal room one because disposal room sampling proceeds to the next panel.

N-3a(3) Ongoing Disposal Room VOC Monitoring in Panels 3 through 7

The Permittees shall continue VOC monitoring in Room 1 of ~~filled~~ Panels 3 through 7 after completion of waste emplacement until final panel closure unless an explosion-isolation wall is installed in the panel.

N-3b Analytes to Be Monitored

The nine VOCs that have been identified for repository and disposal room monitoring are listed in Table N-1. The analysis will focus on routine detection and quantification of these compounds in collected samples. As part of the analytical evaluations, the presence of other compounds will be investigated. The analytical laboratory will be directed to classify and report all of these compounds as Tentatively Identified Compounds (**TICs**).

TICs detected in 10% or more of any VOC monitoring samples (exclusive of those collected from Station VOC-B) that are VOCs listed in Appendix VIII of 20.4.1.200 NMAC (incorporating 40 CFR §261), collected over a running twelve-month timeframe, will be added to the target analyte lists for both the repository and disposal room VOC monitoring programs, unless the Permittees can justify the exclusion from the target analyte list(s).

TICs detected in the repository and disposal room VOC monitoring programs will be placed in the WIPP Operating Record and reported to NMED in the Semi-Annual VOC Monitoring Report as specified in Permit Condition IV.F.2.b.

N-3c Sampling and Analysis Methods

The VOC monitoring programs include a comprehensive VOC monitoring program established at the facility; equipment, training, and documentation for VOC measurements are already in place.

The method used for VOC sampling is based on the concept of pressurized sample collection contained in the U.S. Environmental Protection Agency (**EPA**) Compendium Method TO-15 (EPA, 1999). The TO-15 sampling concept uses 6-liter SUMMA® passivated (or equivalent) stainless-steel canisters to collect integrated air samples at each sample location. This conceptual method will be used as a reference for collecting the samples at WIPP. The samples will be analyzed using gas chromatography/mass spectrometry (**GC/MS**) under an established QA/quality control (**QC**) program. Laboratory analytical procedures have been developed based on the concepts contained in both TO-15 and 8260B. Section N-5 contains additional QA/QC information for this project.

The TO-15 method is an EPA-recognized sampling concept for VOC sampling and speciation. It can be used to provide integrated samples, or grab samples, and compound quantitation for a broad range of concentrations. The sampling system can be operated unattended but requires detailed operator training. This sampling technique is viable for use while analyzing the sample using other EPA methods such as 8260B.

The field sampling systems will be operated in the pressurized mode. In this mode, air is drawn through the inlet and sampling system with a pump. The air is pumped into an initially evacuated SUMMA® passivated (or equivalent) canister by the sampler, which regulates the rate and duration of sampling. The treatment of tubing and canisters used for VOC sampling effectively seals the inner walls and prevents compounds from being retained on the surfaces of the equipment. By the end of each sampling period, the canisters will be pressurized to about two atmospheres absolute. In the event of shortened sampling periods or other sampling conditions, the final pressure in the canister may be less than two atmospheres absolute. Sampling duration will be approximately six hours, so that a complete sample can be collected during a single work shift.

The canister sampling system and GC/MS analytical method are particularly appropriate for the VOC Monitoring Programs because a relatively large sample volume is collected, and multiple dilutions and reanalyses can occur to ensure identification and quantification of target VOCs within the working range of the method. The contract-required quantitation limits (**CRQL**) are 5 parts per billion by volume (**ppbv**) or less for the nine target compounds. Consequently, low concentrations can be measured. CRQLs are the EPA-specified levels of quantitation proposed for EPA contract laboratories that analyze canister samples by GC/MS. For the purpose of this plan, the CRQLs will be defined as the method reporting limits (**MRL**). The MRL is a function of instrument performance, sample preparation, sample dilution, and all steps involved in the sample analysis process.

Disposal room VOC monitoring system in open panels will employ the same canister sampling method as used in the repository VOC monitoring. Passivated or equivalent sampling lines will be installed in the disposal room as described in Section N-3a(2) and maintained once the room is closed until the panel associated with the room is closed. The independent lines will run from

the sample inlet point to the individual sampler located in the access drift to the disposal panel. The air will pass through dual particulate filters to prevent sample and equipment contamination.

N-3d Sampling Schedule

The Permittees will evaluate whether the monitoring systems and analytical methods are functioning properly. The assessment period will be determined by the Permittees.

N-3d(1) Sampling Schedule for Repository VOC Monitoring

Repository VOC sampling at Stations VOC-A and VOC-B will begin with initial waste emplacement in Panel 1. Sampling will continue until the certified closure of the last Underground HWDU. Routine sampling will be conducted two times per week.

N-3d(2) Sampling Schedule for Disposal Room VOC Monitoring

The disposal room sampling in open panels will occur once every two weeks, unless the need to increase the frequency to weekly occurs in accordance with Permit Condition IV.F.3.c.

Beginning with Panel 3, disposal room sampling in filled panels will occur monthly until final panel closure unless an explosion-isolation wall is installed. The Permittees will sample VOCs in Room 1 of each filled panel.

N-3e Data Evaluation and Reporting

N-3e(1) Data Evaluation and Reporting for Repository VOC Monitoring

When the Permittees receive laboratory analytical data from an air sampling event, the data will be validated as specified in Section N-5d. After obtaining validated data from an air sampling event, the data will be evaluated to determine whether the VOC emissions from the Underground HWDUs exceed the COCs. The COCs for each of the nine target VOCs are presented in Permit Module IV, Table IV.F.2.c. The values are presented in terms of micrograms per cubic meter ($\mu g/m^3$) and ppbv.

The COCs were calculated assuming typical operational conditions for ventilation rates in the mine. The typical operational conditions were assumed to be an overall mine ventilation rate of 425,000 standard cubic feet per minute and a flow rate through the E-300 Drift at Station VOC-A of 130,000 standard cubic feet per minute.

Since the mine ventilation rates at the time the air samples are collected may be different than the mine ventilation rates during typical operational conditions, the Permittees will measure and/or record the overall mine ventilation rate and the ventilation rate in the E-300 Drift at Station VOC-A that are in use during each sampling event. The Permittees shall also measure and record temperature and pressure conditions during the sampling event to allow all ventilation rates to be converted to standard flow rates.

If the air samples were collected under the typical mine ventilation rate conditions, then the analytical data will be used without further manipulation. The concentration of each target VOC

detected at Station VOC-B will be subtracted from the concentration detected at Station VOC-A. The resulting VOC concentration represents the concentration of VOCs being emitted from the open and closed Underground HWDUs upstream of Station VOC-A (or the Underground HWDU VOC emission concentration.)

If the air samples were not collected under typical mine ventilation rate operating conditions, the air monitoring analytical results from both Station VOC-A and Station VOC-B will be normalized to the typical operating conditions. This will be accomplished using the mine ventilation rates in use during the sampling event and the following equation:

$$NVOC_{AB} = VOC_{AB} * \left(\frac{425{,}000_{scfm} / 130{,}000_{scfm}}{V_{O\ scfm} / V_{E\text{-}300\ scfm}} \right) \quad \text{(N-1)}$$

Where:

	$NVOC_{AB}$	=	Normalized target VOC concentration from Stations VOC-A or VOC-B
	VOC_{AB}	=	Concentration of the target VOC detected at Station VOC-A or VOC-B under non-typical mine ventilation rates
	scfm	=	Standard cubic feet per minute
	Vo	=	Sampling event overall mine ventilation rate (in standard cubic feet per minute)
	VE-300	=	Sampling event mine ventilation rate through the E-300 Drift (in standard cubic feet per minute)

The normalized concentration of each target VOC detected at Station VOC-B will be subtracted from the normalized concentration detected at Station VOC-A. The resulting concentration represents the Underground HWDU VOC emission concentration.

The Underground HWDU VOC emission concentration for each target VOC that is calculated for each sampling event will be compared directly to its COC listed in Permit Module IV, Table IV.F.2.c. This will establish whether any of the concentrations of VOCs in the emissions from the Underground HWDUs exceeded the COCs at the time of the sampling.

As specified in Permit Module IV, the Permittees shall notify the Secretary in writing, within ~~five (5) working~~ seven(7) calendar days of obtaining validated analytical results, whenever the concentrations of any target VOC listed in exceeds the concentration of concern specified in Permit Module IV, Table IV.F.2.c.

The Underground HWDU VOC emission concentration for each target VOC that is calculated for each sampling event will then be averaged with the Underground HWDU VOC emission concentrations calculated for the air sampling events conducted during the previous 12 months. This will be considered the running annual average concentration for each target VOC. For the first year of air sampling, the running annual average concentration for each target VOC will be calculated using all of the previously collected data.

As specified in Permit Module IV, the Permittees shall notify the Secretary in writing, within ~~five (5) working~~ seven (7) calendar days of obtaining validated analytical results, whenever the

running annual average concentration (calculated after each sampling event) for any target VOC exceeds the concentration of concern specified in Permit Module IV, Table IV.F.2.c.

If the results obtained from an individual air sampling event do not trigger the notification requirements of Permit Module IV, then the Permittees will maintain a database with the VOC air sampling data and the results will be reported to the Secretary as specified in Permit Module IV.

N-3e(2) Data Evaluation and Reporting for Disposal Room VOC Monitoring

When the Permittees receive laboratory analytical data from an air sampling event, the data will be validated as specified in Section N-5a, within ~~ten (10) working~~ fourteen (14) calendar days of receiving the laboratory analytical data. After obtaining validated data from an air sampling event, the data will be evaluated to determine whether the VOC concentrations in the air of any closed room, the active open room, or the immediately adjacent closed room exceeded the Action Levels for Disposal Room Monitoring specified in Permit Module IV, Table IV.F.3.b.

The Permittees shall notify the Secretary in writing, within ~~five (5) working~~ seven (7) calendar days of obtaining validated analytical results, whenever the concentration of any VOC specified in Permit Module IV, Table IV.D.1 exceeds the action levels specified in Permit Module IV, Table IV.F.3.b.

The Permittees shall submit to the Secretary the Semi-Annual VOC Monitoring Report specified in Permit Condition IV.F.2.b that also includes results from disposal room VOC monitoring.

N-4 Sampling and Analysis Procedures

This section describes the equipment and procedures that will be implemented during sample collection and analysis activities for VOCs at WIPP.

N-4a Sampling Equipment

The sampling equipment that will be used includes the following: 6-liter (L) stainless-steel SUMMA® canisters, VOC canister samplers, treated stainless steel tubing, and a dual filter housing. A discussion of each of these items is presented below.

N-4a(1) SUMMA® Canisters

Six-liter, stainless-steel canisters with SUMMA® passivated interior surfaces will be used to collect and store all ambient air and gas samples for VOC analyses collected as part of the monitoring processes. These canisters will be cleaned and certified prior to their use, in a manner similar to that described by Compendium Method TO-15. The canisters will be certified clean to below the required reporting limits for the VOC analytical method for the target VOCs (see Table N-2). The vacuum of certified clean samplers will be verified at the sampler upon initiation of a sample cycle.

included in the sample flow path are replaced, or any time analytical results indicate potential contamination. All sample canisters will be certified prior to each usage.

N-4e Analytical Procedures

Analytical procedures used in the analysis of VOC samples from canisters are based on concepts contained in Compendium Method TO-15 (EPA, 1999) and in SW-846 Method 8260B (EPA, 1996).

Analysis of samples will be performed by a certified laboratory. Methods will be specified in procurement documents and will be selected to be consistent with Compendium Method TO-15 (EPA, 1999) or EPA recommended procedures in SW-846 (EPA, 1996). Additional detail on analytical techniques and methods will be given in laboratory SOPs.

The Permittees will establish the criteria for laboratory selection, including the stipulation that the laboratory follow the procedures specified in the appropriate Air Compendium or SW-846 method and that the laboratory follow EPA protocols. The selected laboratory shall demonstrate, through laboratory SOPs, that it will follow appropriate EPA SW-846 requirements and the requirements specified by the EPA Air Compendium protocols. The laboratory shall also provide documentation to the Permittees describing the sensitivity of laboratory instrumentation. This documentation will be retained in the facility operating record and will be available for review upon request by NMED.

The SOPs for the laboratory currently under contract will be maintained in the operating record by the Permittees. The Permittees will provide NMED with an initial set of applicable laboratory SOPs for information purposes, and provide NMED with any updated SOPs on an annual basis.

Data validation will be performed by the Permittees. Copies of the data validation report will be kept on file in the operating record for review upon request by NMED.

N-5 Quality Assurance

The QA activities for the VOC monitoring programs will be conducted in accordance with the documents: *EPA Guidance for Quality Assurance Project Plans QA/G-5* (EPA, 2002) and the *EPA Requirements for Preparing Quality Assurance Project Plans, QA/R-5* (EPA, 2001). The QA criteria for the VOC monitoring programs are listed in Table N-2. This section addresses the methods to be used to evaluate the components of the measurement system and how this evaluation will be used to assess data quality. The QA limits for the sampling procedures and laboratory analysis shall be in accordance with the limits set forth in the specific EPA Method referenced in standard operating procedures employed by either the Permittees or the laboratory. The Permittees standard operating procedures will be in the facility Operating Record and available for review by NMED at anytime. The laboratory standard operating procedures will also be in the facility Operating Record and will be supplied to the NMED as indicated in Section N-4e ~~of this Attachment~~.

with 40 *Code of Federal Regulations* §136 and with EPA/530-SW-90-021, as revised and retitled, "Quality Assurance and Quality Control" (Chapter 1 of SW-846) (1996).

N-5a(5) Completeness

The expected completeness for this program is greater than or equal to 90 percent. Data completeness will be tracked monthly.

N-5b Sample Handling and Custody Procedures

Sample packaging, shipping, and custody procedures are addressed in Section N-4c.

N-5c Calibration Procedures and Frequency

Calibration procedures and frequencies for analytical instrumentation are listed in Section N-4e.

N-5d Data Reduction, Validation, and Reporting

A dedicated logbook will be maintained by the operators. This logbook will contain documentation of all pertinent data for the sampling. Sample collection conditions, maintenance, and calibration activities will be included in this logbook. Additional data collected by other groups at WIPP, such as ventilation airflow, temperature, pressure, etc., will be obtained to document the sampling conditions.

Data validation procedures will include at a minimum, a check of all field data forms and sampling logbooks will be checked for completeness and correctness. Sample custody and analysis records will be reviewed routinely by the QA officer and the laboratory supervisor.

Electronic Data Deliverables (**EDDs**) are provided by the laboratory prior to receipt of hard copy data packages. EDDs will be evaluated within ~~three (3) working~~ five (5) calendar days of receipt to determine if VOC concentrations are at or above action levels in Table IV.F.3.b for disposal room monitoring data or concentrations of concern in Table IV.F.2.c for repository monitoring data. If the EDD indicates that VOC concentrations are at or above these action levels or concentrations, the hard copy data package will be validated within ~~three (3) working~~ five (5) calendar days as opposed to the ~~ten (10) working~~ fourteen (14) calendar day time frame provided by Section N-3e(2).

Data will be reported as specified in Section N-3(e) and Permit Module IV.

Acceptable data for this VOC monitoring plan will meet stated precision and accuracy criteria. The QA objectives for precision, accuracy, and completeness as shown in Table N-2 can be achieved when established methods of analyses are used as proposed in this plan and standard sample matrices are being assessed.

N-5e Performance and System Audits

System audits will initially address start-up functions for each phase of the project. These audits will consist of on-site evaluation of materials and equipment, review of canister and sampler

Unless otherwise specified, VOC monitoring plan records will be retained as lifetime records. Temporary and permanent storage of QA records will occur in facilities that prevent damage from temperature, fire, moisture, pressure, excessive light, and electromagnetic fields. Access to stored VOC Monitoring Program QA Records will be controlled and documented to prevent unauthorized use or alteration of completed records.

Revisions to completed records (i.e., as a result of audits or data validation procedures) may be made only with the approval of the responsible program manager and in accordance with applicable QA procedures. Original and duplicate or backup records of project activities will be maintained at the WIPP site. Documentation will be available for inspection by internal and external auditors.

N-6 Sampling and Analysis Procedures for Disposal Room VOC Monitoring in Filled Panels

~~VOC Disposal Room monitoring in the filled panels, beginning with Panel 3, will be continued until final panel closure unless an explosion-isolation wall is installed. The Permittees will continue monitoring VOCs in Room 1 of each filled panel monthly to assure worker safety and protection. Only VOCs in the adjacent closed room (Room 1 in a filled panel) pose a potential health risk to workers in the immediate vicinity.~~

Disposal room VOC samples in filled panels will be collected using the subatmospheric pressure grab sampling technique described in Compendium Method TO-15 (EPA, 1999). This method uses an evacuated SUMMA® passivated canister (or equivalent) that is under vacuum (0.05 mm Hg) to draw the air sample from the sample lines into the canister. The sample lines will be purged prior to sampling to ensure that a representative sample is collected. The passivation of tubing and canisters used for VOC sampling effectively seals the inner walls and prevents compounds from being retained on the surfaces of the equipment. By the end of each sampling period, the canisters will be near atmospheric pressure.

The analytical procedures for disposal room VOC monitoring in filled panels are the same as specified in ~~Attachment N,~~ Section N-4e.

ATTACHMENT N1

HYDROGEN AND METHANE MONITORING PLAN

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ATTACHMENT N1

HYDROGEN AND METHANE MONITORING PLAN

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ATTACHMENT N1

VOLATILE ORGANIC COMPOUND MONITORING PLAN

N1-1 Introduction

This Permit Attachment describes the monitoring plan for hydrogen and methane generated ~~in filled rooms~~ in Underground Hazardous Waste Disposal Units (**HWDUs**) 3 through 7, also referred to as Panels 3 through 7.

Monitoring for hydrogen and methane in Panels 3 through 7 until final panel closure, unless an explosion-isolation wall is installed, may be an effective way to gather data to establish realistic gas generation rates. This plan includes the monitoring design, a description of sampling and analysis procedures, quality assurance (**QA**) objectives, and reporting activities.

N1-2 Parameters to be Analyzed and Monitoring Design

The Permittees will monitor for hydrogen and methane in filled Panels 3 through 7 until final panel closure, unless an explosion-isolation wall is installed. A "filled panel" is an Underground HWDU that will no longer receive waste for emplacement.

Monitoring of a filled panel~~s~~ will commence after installation of ~~involve installing~~ the following items in each filled panel:

- substantial barriers
- bulkheads
- five additional monitoring locations.

The substantial barriers serve to protect the waste from events such as ground movement or vehicle impacts. The substantial barrier will be constructed from available non-flammable materials such as mined salt (Figure N1-1).

The bulkheads (Figure N1-2) serves to block ventilation at the intake and exhaust of the filled panel and prevent personnel access. The bulkhead is constructed as a typical WIPP bulkhead with no access doors or panels. The bulkhead will consist of a steel member frame covered with galvanized sheet metal, and will not allow personnel access. Rubber conveyor belt will be used as a gasket to attach the steel frame to the salt, thereby providing an effective yet flexible blockage to ventilation air. Over time, it is possible that the bulkhead may be damaged by creep closure around it. If the damage is such as to indicate a possible loss of functionality, then the bulkhead will be repaired or an additional bulkhead will be constructed outside of the original one.

The existing VOC monitoring lines as specified in Attachment N, Section N-3a(2), "Sampling Locations for Disposal Room VOC Monitoring", will be used for sample collection in each disposal room for Panels 3 through 7. The sample lines and their construction are shown in

Figure N1-3. In addition to the existing VOC monitoring lines, five more sampling locations will be used to monitor for hydrogen and methane. These additional locations include:

- the intake of room 1
- the waste side of the exhaust bulkhead,
- the accessible side of the exhaust bulkhead,
- the waste side of the intake bulkhead,
- the accessible side of the intake bulkhead.

These additional sampling locations (Figure N1-4) will use a single inlet sampling point placed near the back (roof) of the panel access drifts. This will maximize the sampling efficiency for these lighter compounds.

N1-3 Sampling Frequency

Sampling frequency will vary depending upon the levels of hydrogen and methane that are detected.

- If monitored concentrations are at or below Action Level 1 as specified in Table IV.F.5.b, monitoring will be conducted monthly.

- If monitored concentrations ~~are above~~ exceed Action Level 1 as specified in Table IV.F.5.b, monitoring will be ~~increased to~~ conducted weekly in the affected filled panel.

N1-4 Sampling

Samples for hydrogen and methane will be collected using subatmospheric pressure grab sampling as described in Environmental Protection Agency (**EPA**) Compendium Method TO-15 (EPA, 1999). The TO-15 sampling method uses passivated stainless-steel sample canisters to collect integrated air samples at each sample location. Flow rates and sampling duration may be modified as necessary to meet data quality objectives.

Sample lines shall be purged prior to sample collection.

N1-5 Sampling Equipment

N1-5a SUMMA® Canisters

Stainless-steel canisters with passivated or equivalent interior surfaces will be used to collect and store gas samples for hydrogen and methane analyses collected as part of the monitoring processes. These canisters will be cleaned and certified prior to their use in a manner similar to that described by Compendium Method TO-15 (EPA, 1999). The vacuum of certified clean canisters will be verified upon initiation of a sample cycle. Sampling will be conducted using subatmospheric pressure grab sampling techniques as described in TO-15.

N1-5b Sample Tubing

Treated stainless steel tubing shall be used as a sample path and treatment shall prevent the inner walls from absorbing contaminants.

Any loss of the ability to purge a sample line will be evaluated. The criteria used for evaluation are shown in Figure N1-5.

The Permittees will first suspect that a line is not useable when it is purged prior to sampling. If the line cannot be purged, then it will not be used for sampling unless the line is a bulkhead line that can be easily replaced. Replacement of bulkhead lines will occur before the next scheduled sample. Non-bulkhead lines will be evaluated by first determining if adjacent sampling lines are working. If the answer is no, then the previous sample from the failed line will be examined. If the previous sample was between the first and second action levels, then the explosion-isolation wall will be installed since without the ability to monitor it is unknown whether the area is approaching the second action level or decreasing. If the previous sample was below the first action level then continued sampling is acceptable without the lost sample.

If an adjacent line is working, the prior concentrations measured in that line will be evaluated to determine if it is statistically similar to the prior measurements from the lost line. If the prior sampling results are statistically similar, the lines can be grouped. Statistical similarity will be determined using the Student's "t" test to evaluate differences.

The magnitude of *t* will be compared to the critical *t* value from SW-846, Table 9-2 (EPA, 1996), for this statistical test.

If the lost line can be grouped with an adjacent line, no further action is necessary because the unmonitored area is considered to be represented by the adjacent areas. If the lost sample line cannot be grouped with an adjacent line, the previous concentration measurement will be compared to the Action Levels. If the concentration is below Action Level 1, monitoring will continue. If the concentration is between Action Level 1 and Action Level 2, the explosion-isolation wall will be installed in the panel.

N1-6 Sample Management

Sample containers shall be sealed and uniquely marked at the time of collection of the sample. A Request-for-Analysis Form shall be completed to identify the sample canister number(s), sample type, and type of analysis requested.

N1-7 Analytical Procedures

The samples will be analyzed using gas chromatography equipped with the appropriate detector under an established QA/quality control (**QC**) program. Analysis of samples shall be performed by a laboratory that the Permittees select and approve through established QA processes.

N1-8 Data Evaluation and Notifications

Analytical data from sampling events will be evaluated to determine whether the sample concentrations of flammable gases exceed the Action Levels.

If any Action Level is exceeded, notification will be made to ~~the~~ NMED and the notification posted to the WIPP web page and accessed through the email notification system within 7 (seven) calendar days of obtaining validated analytical data.

If any sampling line loss occurs, notification will be made to ~~the~~ NMED and the notification posted to the WIPP web page and accessed through the email notification system within 7 (seven) calendar days of learning of a sampling line loss. After the evaluation of the impact of sampling line loss as shown in Figure N1-5, notification will be made to ~~the~~ NMED and the notification posted to the WIPP web page and accessed through the email notification system within 7 (seven) calendar days of completing the sampling line loss evaluation.

N1-9 References

U.S. Environmental Protection Agency (EPA), 1996. SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. 3rd Edition. Office of Solid Waste and Emergency Response, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1999. *Compendium Method TO-15: Determination of Volatile Organic Compounds (VOCs) In Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography/Mas Spectrometry*, EPA 625/R-96/010b. Center for Environmental Research Information, Office of Research and Development, Cincinnati, OH, January 1999.

1

FIGURES

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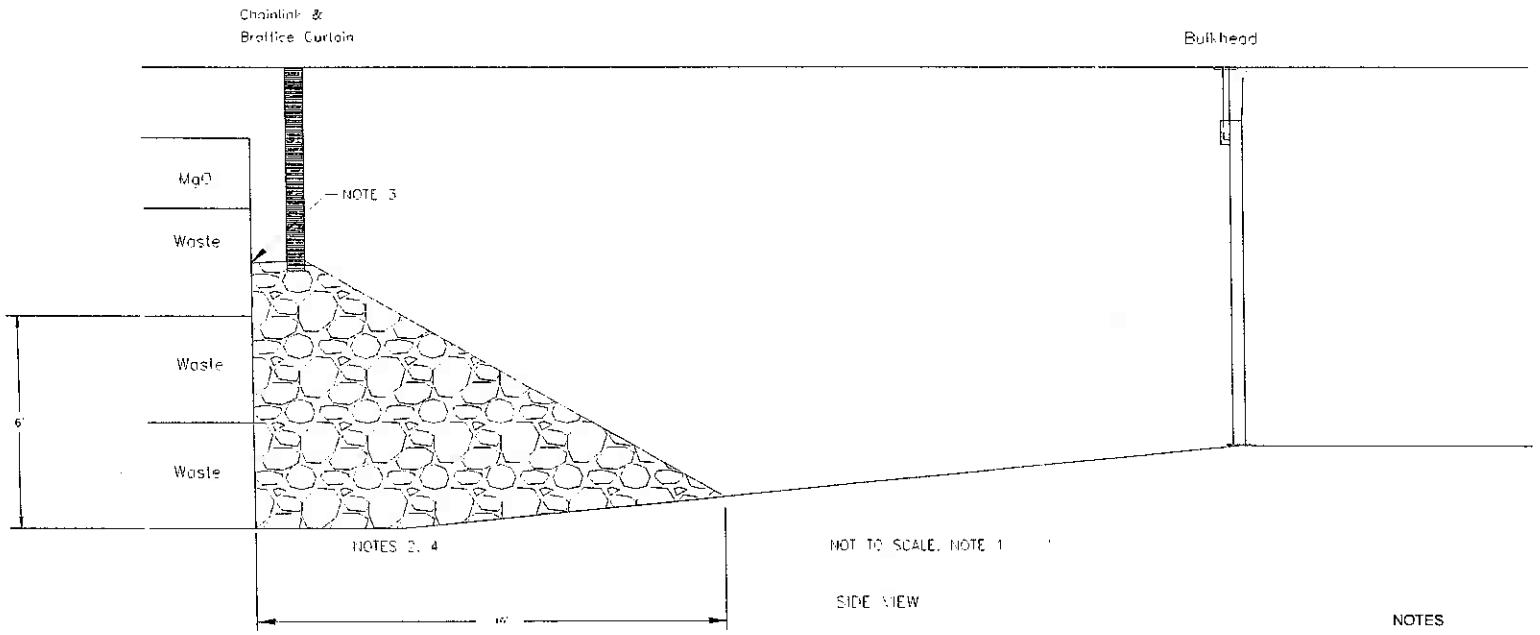


NOTES

1. CONFIGURATION AND PLACEMENT OF THE SUBSTANTIAL BARRIER AND THE BULKHEAD DICTATED BY AS-FOUND (FIELD) CONDITIONS, AS DESIGNATED BY THE COGNIZANT ENGINEER.
2. SUBSTANTIAL BARRIER MATERIAL WILL CONSIST OF RUN-OF-MINE SALT OR OTHER SUITABLE NON-FLAMMABLE MATERIAL AS DESIGNATED BY THE COGNIZANT ENGINEER.
3. SUBSTANTIAL BARRIER MATERIAL SHOULD BE AGAINST THE WASTE FACE. THE HEIGHT OF THE SUBSTANTIAL BARRIER NEAR THE WASTE WILL BE AT LEAST EQUAL TO THE HEIGHT OF THE BOTTOM OF THE TOP ROW OF WASTE.
4. DIMENSIONS INDICATED ARE MINIMUMS. THE HEIGHT OF THE SUBSTANTIAL BARRIER IS MEASURED AT THE WASTE FACE. THE LENGTH OF THE SUBSTANTIAL BARRIER IS MEASURED FROM THE BOTTOM OF THE WASTE FACE TO THE TOE OF THE SUBSTANTIAL BARRIER MATERIAL.

Figure N1-1
Typical Substantial Barrier and Bulkhead

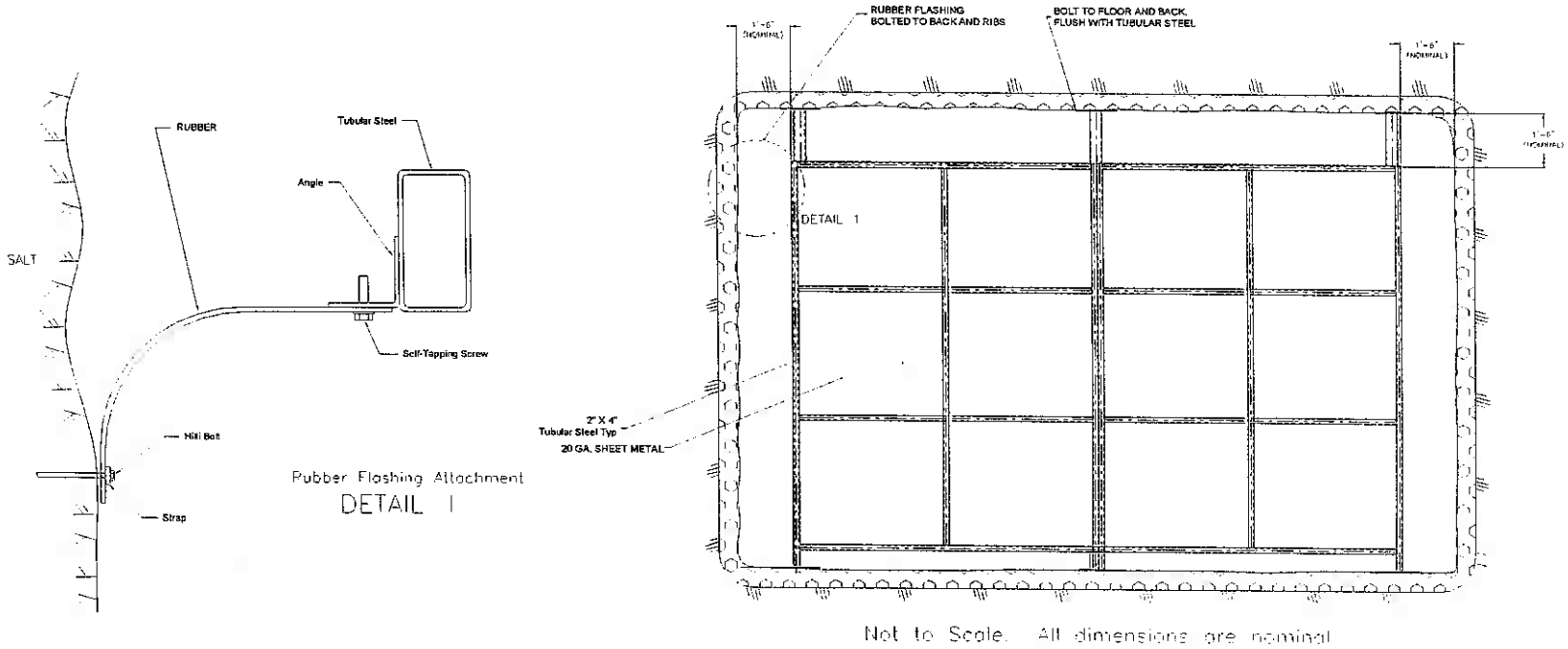
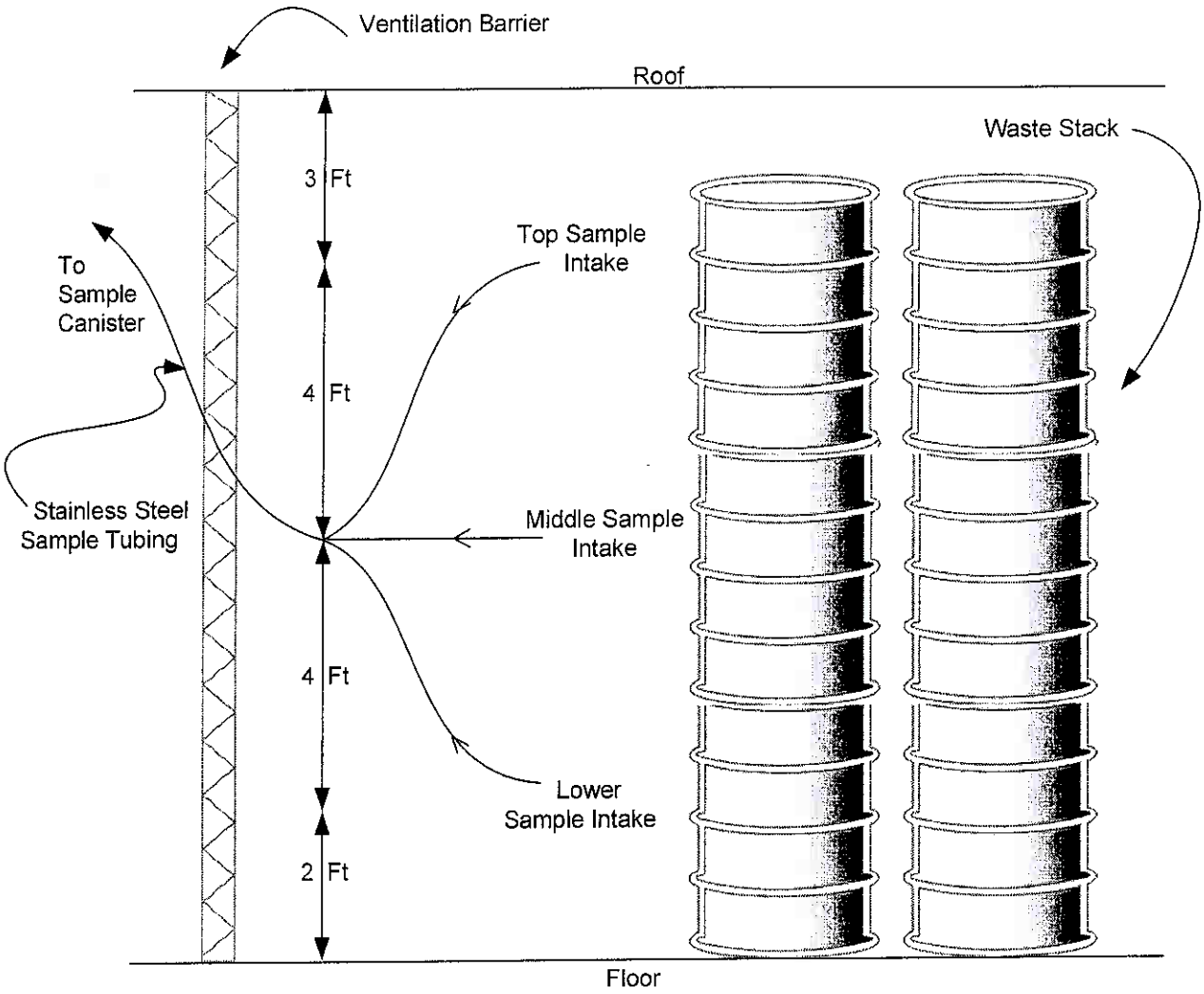


Figure N1-2
Typical Bulkhead



(not to scale, all measurements approximate)

Figure N1-3
Typical Hydrogen and Methane Monitoring System

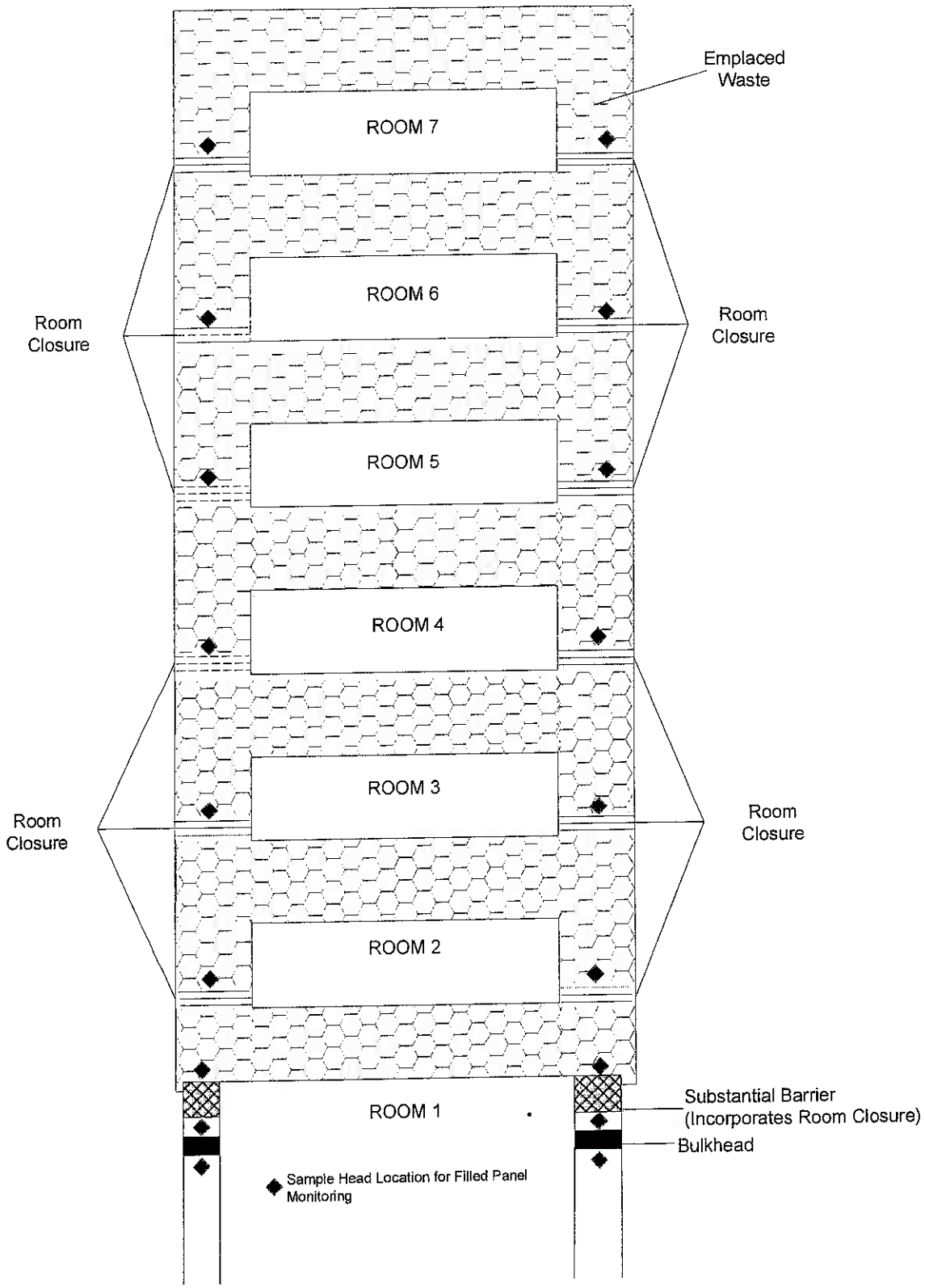
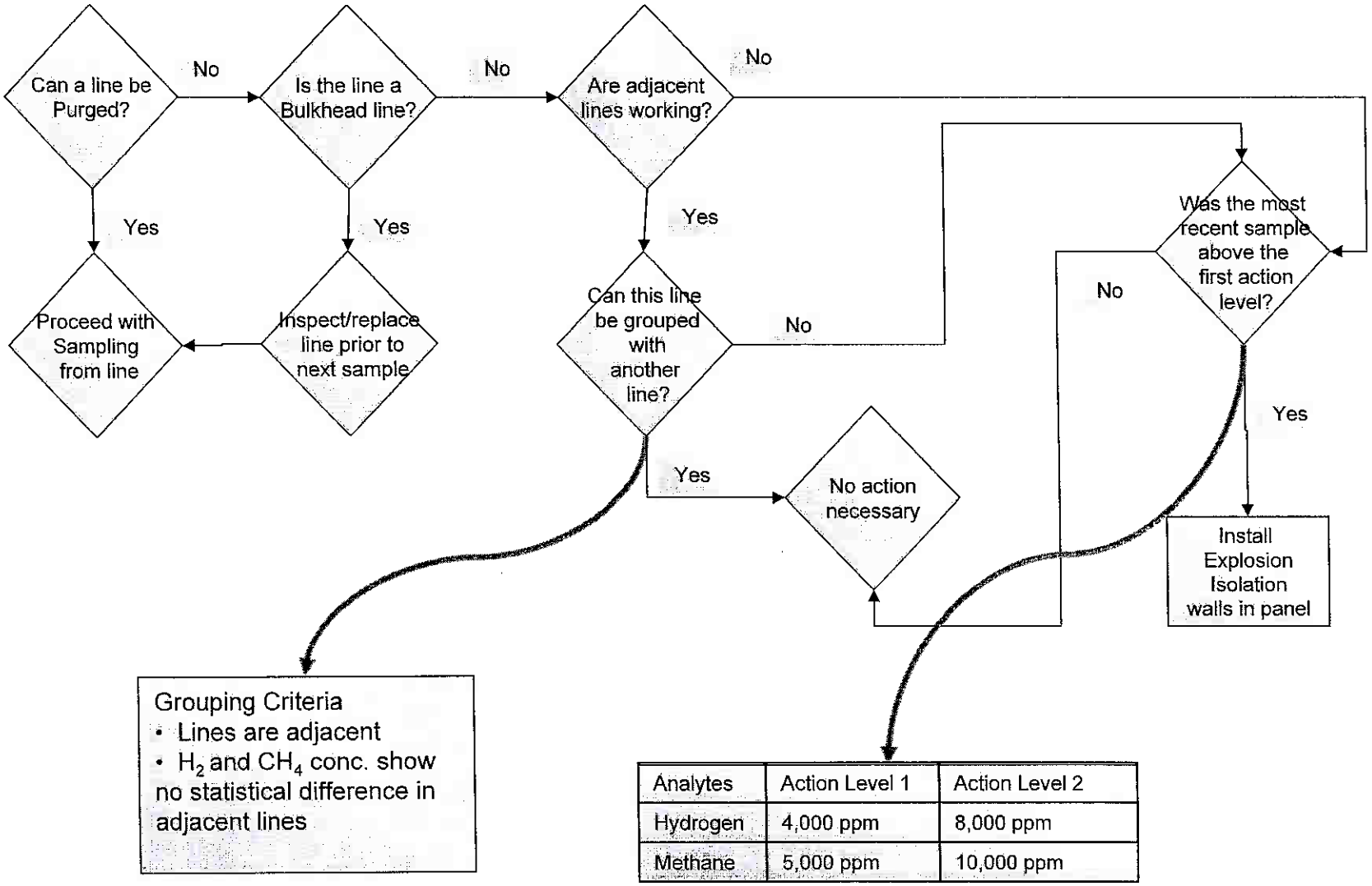


Figure N1-4
Typical Hydrogen and Methane Sampling Locations



Analytes	Action Level 1	Action Level 2
Hydrogen	4,000 ppm	8,000 ppm
Methane	5,000 ppm	10,000 ppm

Figure N1-5
Logic Diagram for Evaluating Sample Line Loss

ATTACHMENT O

HAZARDOUS WASTE PERMIT APPLICATION PART A

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NM4890139088

8. PROCESS—CODES AND DESIGN CAPACITIES (continued)

The Waste Isolation Pilot Plant (WIPP) geologic repository is defined as a "miscellaneous unit" under 40 CFR §260.10. "Miscellaneous unit" means a hazardous waste management unit where hazardous waste is treated, stored, or disposed of and that is not a container, tank, surface impoundment, waste pile, land treatment unit, landfill, incinerator, containment building, boiler, industrial furnace, or underground injection well with appropriate technical standards under 40 CFR Part 146, corrective action management unit, or unit eligible for research, development, and demonstration permit under 40 CFR §270.65. The WIPP is a geologic repository designed for the disposal of defense-generated transuranic (TRU) waste. Some of the TRU wastes disposed of at the WIPP contain hazardous wastes as co-contaminants. More than half the waste to be disposed of at the WIPP also meets the definition of debris waste. The debris categories include manufactured goods, biological materials, and naturally occurring geological materials. Approximately 120,000 cubic meters (m^3) of the 175,600 m^3 of WIPP wastes is categorized as debris waste. The geologic repository has been divided into ten discrete hazardous waste management units (HWMU) which are being permitted under 40 CFR Part 264, Subpart X.

During the Disposal Phase of the facility, which is expected to last 25 years, the total amount of waste received from off-site generators and any derived waste will be limited to 175,600 m^3 of TRU waste of which up to 7,080 m^3 may be remote-handled (RH) TRU mixed waste. For purposes of this application, all TRU waste is managed as though it were mixed.

On March 25, 1996, the DOE reached the conclusion that in order to comply with 40 CFR 191 §13 which regulates the long-term release of radionuclides from a geologic disposal facility, it is necessary to add magnesium oxide to each disposal room. This additive is to be placed as a backfill. The function of the backfill is to chemically alter the composition of brine that may accumulate in the disposal region. The result of the chemical alteration is to significantly reduce the solubility of the prevalent TRU radionuclides.

The process design capacity for the miscellaneous unit (composed of ten underground HWMUs in the geologic repository) shown in Section XII B, is for the maximum amount of waste that may be received from off-site generators plus the maximum expected amount of derived wastes that may be generated at the WIPP facility. In addition, two HWMUs have been designated as container storage units (S01) in Section XII. One is inside the Waste Handling Building (WHB) and consists of the contact-handled (CH) bay, waste shaft conveyance loading room, waste ~~hoist~~ shaft conveyance entry room, RH bay, cask unloading room, hot cell, transfer cell, and facility cask loading room. This HWMU will be used for waste receipt, handling, and storage (including storage of derived waste) prior to emplacement in the underground geologic repository. No treatment or disposal will occur in this S01 HWMU. The capacity of this S01 unit for storage is 194.1 m^3, based on 36 ten-drum overpacks on 18 facility pallets, four CH Packages at the TRUDOCKs, one standard waste box of derived waste, two loaded casks and one 55-gallon drum of derived waste in the RH Bay, one loaded cask in the Cask Unloading Room, 13 55-gallon drums in the Hot Cell, one canister in the Transfer Cell and one canister in the Facility Cask Unloading Room. The second S01 HWMU is the parking area outside the WHB where the Contact- and Remote-Handled Package trailers and the road cask trailers will

NM4890139088

RCRA PART A APPLICATION CERTIFICATION

The U.S. Department of Energy (DOE), through its Carlsbad Field Office, has signed as "owner and operator," and Washington TRU Solutions LLC, the Management and Operating Contractor (MOC), has signed this application for the permitted facility as "co-operator."

The DOE has determined that dual signatures best reflect the actual apportionment of Resource Conservation and Recovery Act (RCRA) responsibilities as follows:

The DOE's RCRA responsibilities are for policy, programmatic directives, funding and scheduling decisions, Waste Isolation Pilot Plant (WIPP) requirements of DOE generator sites, auditing, and oversight of all other parties engaged in work at the WIPP, as well as general oversight.

The MOC's RCRA responsibilities are for certain day-to-day operations (in accordance with general directions given by the DOE and in the Management and Operating Contract as part of its general oversight responsibility), including, but not limited to, the following: certain waste handling, monitoring, record keeping, certain data collection, reporting, technical advice, and contingency planning.

For purposes of the certification required by Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1 (20.4.1 NMAC), Subpart IX, §270.11(d), the DOE's and the MOC's representatives certify, under penalty of law that this document and all attachments were prepared under their direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on their 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 their knowledge and belief, true, accurate, and complete for their respective areas of responsibility. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Owner and Operator Signature:	*Original signed by David Moody*
Title:	Manager, Carlsbad Field Office
for:	U.S. Department of Energy
Date:	9/10/07

Co-Operator Signature:	*Original signed by ~~Richard D. Raaz~~ Farok Sharif*
Title:	General Manager
for:	Washington TRU Solutions LLC
Date:	~~12/14/05~~ 9/7/07

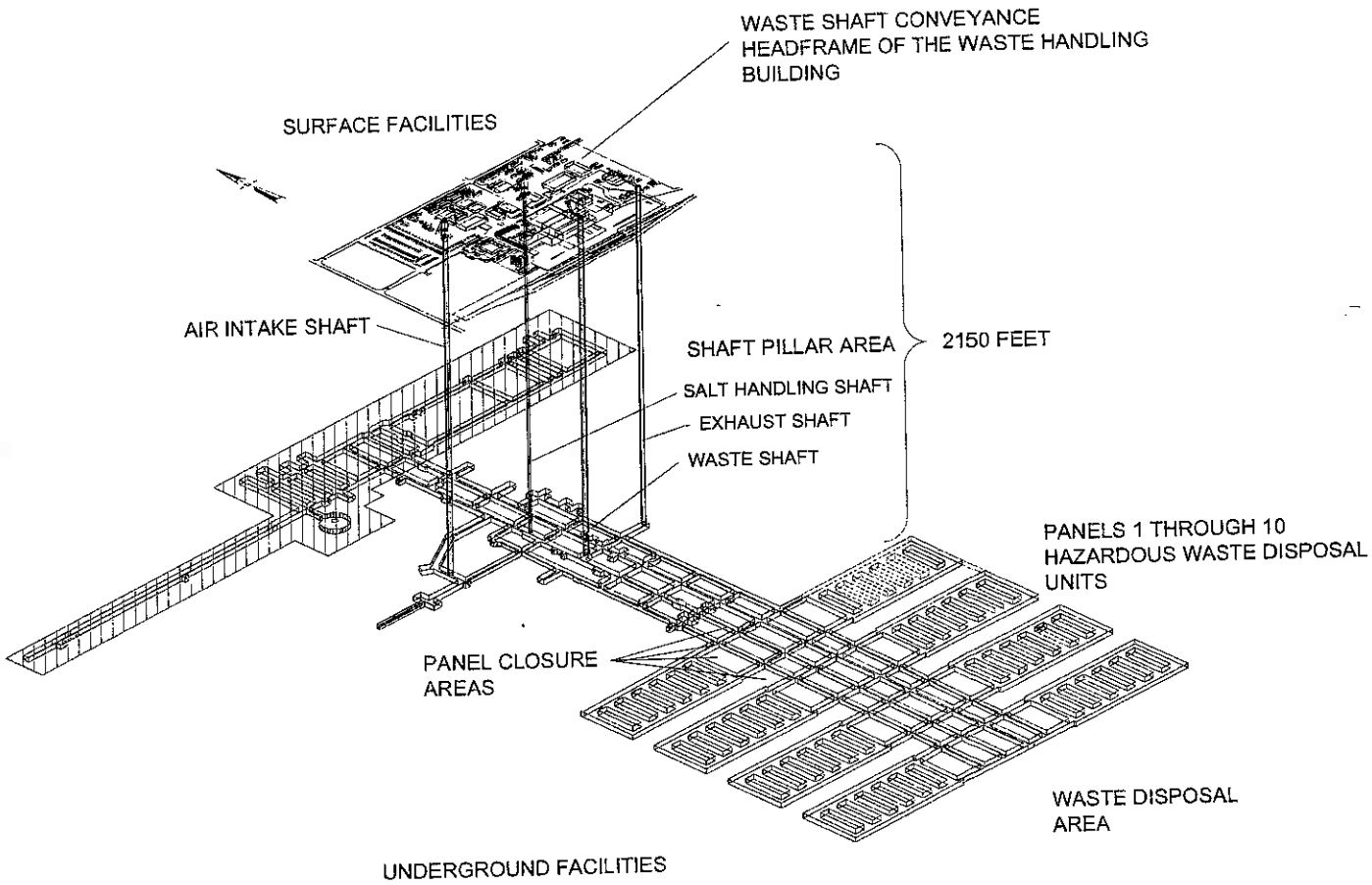
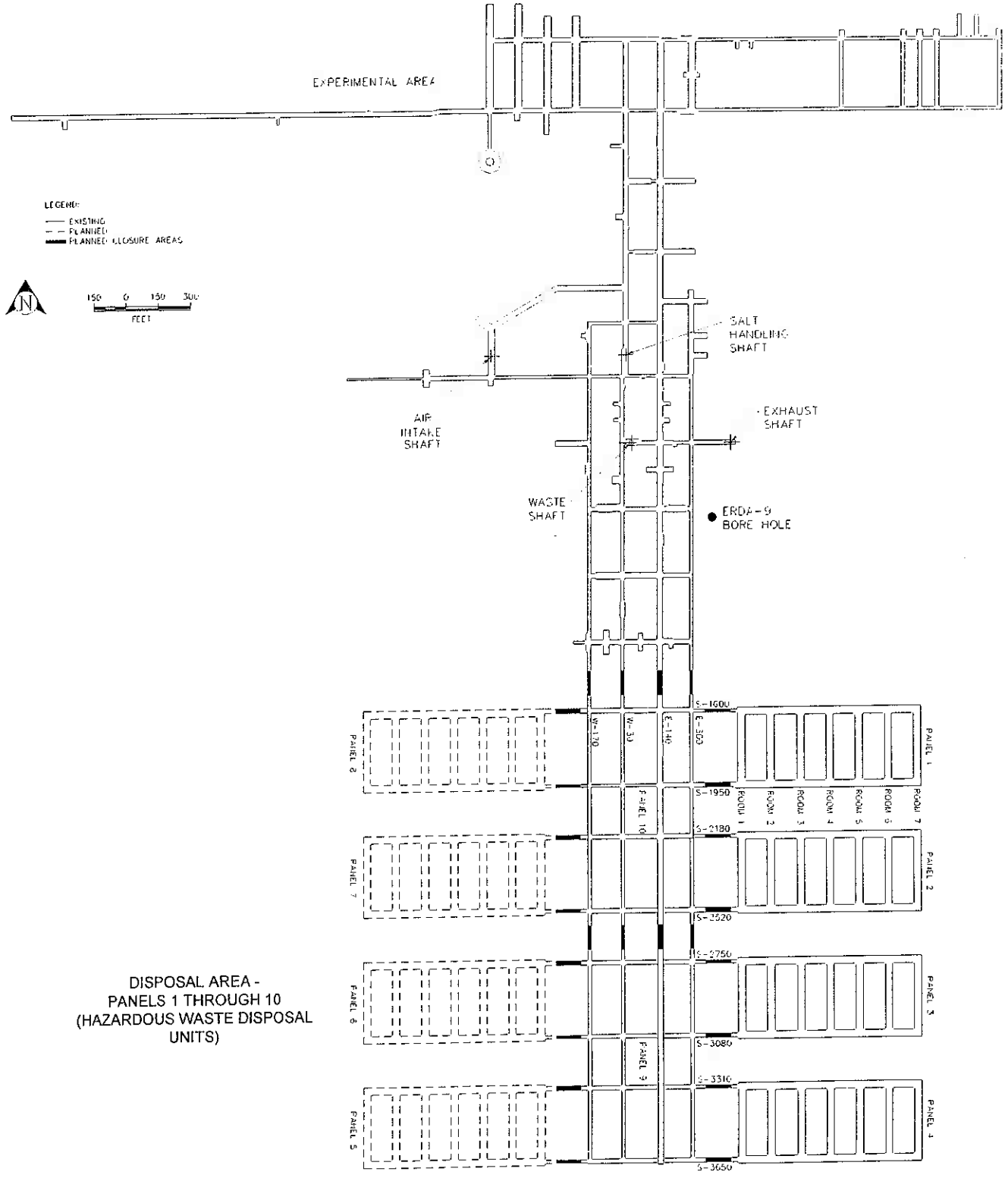


Figure O3-1
Spatial View of the WIPP Facility



DISPOSAL AREA -
PANELS 1 THROUGH 10
(HAZARDOUS WASTE DISPOSAL
UNITS)

Figure O3-2
Repository Horizon

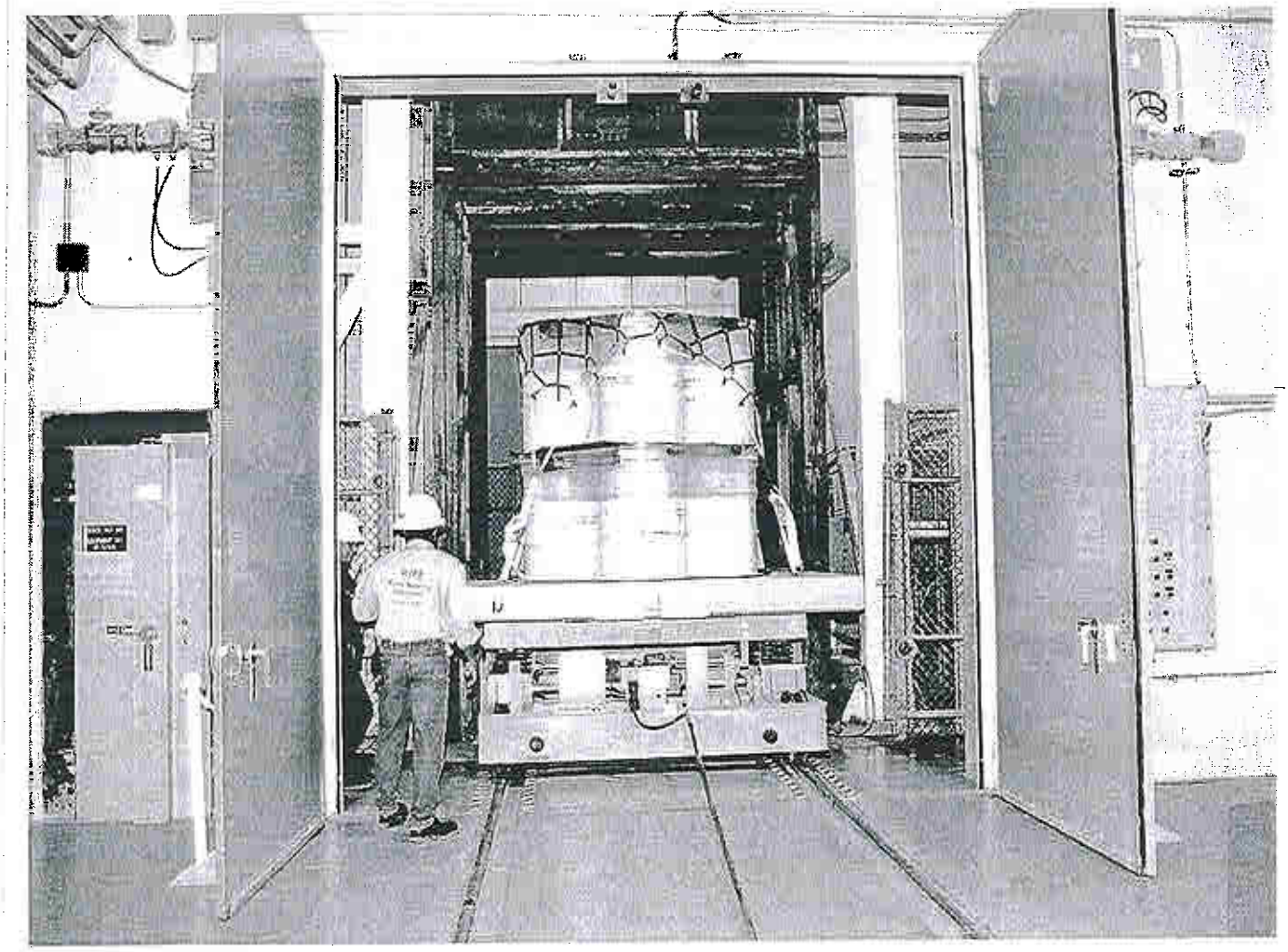


Figure O4-7
Waste ~~Hoist~~ Shaft Conveyance - Loading Facility Pallet with CH Waste, Waste Handling Building