I. MODULE I - GENERAL PERMIT CONDITIONS

I.A. EFFECT OF PERMIT

The Secretary of the New Mexico Environment Department (**Secretary**) issues this Permit to the United States Department of Energy (**DOE**), the owner and co-operator of the Waste Isolation Pilot Plant (**WIPP**) (EPA I.D. Number NM4890139088), and Washington TRU Solutions LLC, Management and Operating Contractor (**MOC**), the co-operator of WIPP. This Permit authorizes DOE and MOC (**the Permittees**) to manage, store, and dispose contact-handled (**CH**) and remote-handled (**RH**) transuranic (**TRU**) mixed waste at WIPP, and establishes the general and specific standards for these activities, pursuant to the New Mexico Hazardous Waste Act (**HWA**), NMSA 1978, §§74-4-1 et. seq. (Repl. Pamp. 1993) and the New Mexico Hazardous Waste Regulations, 20.4.1.100 NMAC et. seq.

Compliance with this Permit during its term shall constitute compliance, for purposes of enforcement, with Subtitle C of the Resource Conservation and Recovery Act (**RCRA**), 42 U.S.C. §6901 et. seq., and/or the HWA, and/or their implementing regulations. Compliance with this Permit shall not constitute a defense to any order issued or any action brought under Sections 74-4-10.E or 74-4-13 of the HWA; Sections 3008(a), 3008(h), 3013, or 7003 of RCRA; the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §9601 et seq., commonly known as CERCLA) Sections 106(a), 104, or 107; or any other law providing for protection of public health or the environment. This Permit does not convey any property rights of any sort or any exclusive privilege, nor authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local laws or regulations. [20.4.1.900 NMAC (incorporating 40 CFR §§270.4 and 270.30(g))]

I.B. PERMIT ACTIONS

I.B.1. Permit Modification, Suspension, and Revocation

This Permit may be modified, suspended, and/or revoked for cause as specified in Section 74-4-4.2 of the HWA and 20.4.1.900 NMAC (incorporating 40 CFR §§270.41, 270.42, and 270.43). The filing of a request by the Permittees for a permit modification, suspension, or revocation, or the notification of planned changes or anticipated noncompliance, shall not stay any permit condition. [20.4.1.900 NMAC (incorporating 40 CFR §270.30(f))]

I.B.2. Permit Renewal

The Permittees may renew this Permit by submitting an application for a new Permit at least one hundred eighty (180) calendar days before the expiration date of this Permit. In reviewing any application for a Permit renewal, the Secretary shall consider improvements in the state of control and measurement technology and changes in applicable regulations. [20.4.1.900 NMAC (incorporating 40 CFR §§270.10(h) and 270.30(b))]

I.B.3. Permit Review

The Secretary shall review this Permit no later than five (5) years after the effective date of this Permit, and shall modify this Permit as necessary pursuant to Section 74-4-4.2 of the HWA and 20.4.1.900 NMAC (incorporating 40 CFR §270.41). Such modification(s) shall not extend the effective term of this Permit specified in Permit Condition I.E.2. [20.4.1.900 NMAC (incorporating 40 CFR §§270.41 and 270.50(b) and (d))]

I.C. SEVERABILITY

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby. [40 CFR §124.16(a)(1) and (2)]

I.D. DEFINITIONS

Unless otherwise expressly provided herein, the terms used in this Permit shall have the meaning set forth in RCRA, HWA, and/or their implementing regulations.

I.D.1. Contact-handled Transuranic Mixed Waste

"Contact-handled transuranic mixed waste" means transuranic mixed waste with a surface dose rate not greater than 200 millirem per hour. [Pub. L. 102-579 (1992)]

I.D.2. Remote-handled Transuranic Mixed Waste

“Remote-handled transuranic mixed waste” means transuranic mixed waste with a surface dose rate of 200 millirem per hour or greater. [Pub. L. 102-579 (1992)]~~ (LWA), as amended by the National Defense Authorization Act for Fiscal Year 1997 Pul. L. 104-201).~~

I.D.3. Facility

"Facility" or "permitted facility" means the Waste Isolation Pilot Plant (**WIPP**) owned by the DOE and located approximately twenty six (26) miles east of Carlsbad, New Mexico, EPA I.D. Number NM4890139088. The WIPP facility comprises the entire complex within the WIPP Site Boundary as specified in the WIPP Land Withdrawal Act of 1992, Pub. L. 102-579 (1992), including all contiguous land, and structures, other appurtenances, and improvements on the Permittees' land, used for management, storage, or disposal of TRU mixed waste.

I.D.4. Permittees

"Permittees" means the United States Department of Energy (**DOE**), an agency of the Federal government, and the owner and co-operator of the WIPP facility; and Washington TRU Solutions LLC, Management and Operating Contractor (**MOC**), the co-operator of the WIPP facility.

I.D.5. Secretary

"Secretary" means the Secretary of the New Mexico Environment Department (**NMED**), or designee.

I.D.6. TRU Waste

"TRU Waste" means waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for (A) high-level radioactive waste; (B) waste that the DOE Secretary has determined, with the concurrence of the EPA Administrator, does not need the degree of isolation required by the disposal regulations; or (C) waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with part 61 of title 10, Code of Federal Regulations. [Pub. L. 102-579 (1992)]

I.D.7. TRU Mixed Waste

"TRU Mixed Waste" means TRU waste that is also a hazardous waste as defined by the HWA and 20.4.1.200 NMAC (incorporating 40 CFR §261.3).

I.D.8. Contact Handled Packages

"Contact Handled Packages" means both TRUPACT-II and HalfPACT shipping containers and their contents.

I.D.9. Remote-Handled Packages

“Remote-Handled Packages” means both CNS 10-160B and RH-TRU 72-B shipping containers and their contents. ~~They are also known as casks.~~

I.D.10. Containment Pallet

“Containment pallet” means ~~is defined as~~ a device capable of ~~staging~~ holding a minimum of one 55-gallon drum, or 85-gallon drum, or 100-gallon drum or a standard waste box, or a ten-drum overpack and that has internal containment for up to ten percent of the volume of the containers on the containment pallet. ~~A containment pallet may also be referred to as a container handling pallet.~~

I.D.11. Waste Characterization

"Waste characterization" or "characterization" means the activities performed by the waste generator to satisfy the general waste analysis requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.13(a)), which can be met by applying acceptable knowledge, conducting sampling and analysis, or a combination of both. 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 311 of Pub. L. 108-137. Confirmation occurs after waste containers have been certified for disposal at WIPP.

I.D.13. Acceptable Knowledge

"Acceptable knowledge" or "AK" means the use of 1) process knowledge, 2) waste analysis data, and/or 3) records of analyses performed before the effective date of RCRA regulations to satisfy all or part of the waste characterization requirements of 40 CFR §264.13.

I.E. DUTIES AND REQUIREMENTS

I.E.1. Duty to Comply

The Permittees shall comply with all conditions of this Permit, except to the extent and for the duration such noncompliance is authorized in an emergency permit specified in 20.4.1.900 NMAC (incorporating 40 CFR §270.61). Any Permit noncompliance, except under the terms of an emergency permit, constitutes a violation of RCRA and/or HWA and is grounds for enforcement action; for Permit modification, suspension, or revocation; or for denial of a Permit modification or renewal application. [20.4.1.900 NMAC (incorporating 40 CFR §270.30(a))]

I.E.2. Permit Term

This Permit shall be effective for a fixed term not to exceed ten (10) years from the date of issuance as specified in the Permit certificate. [20.4.1.900 NMAC (incorporating 40 CFR §270.50(a))]

I.E.3. Duty to Reapply

If the Permittees wish to continue an activity regulated by this Permit after the expiration date of this Permit, the Permittees shall apply for and obtain a new Permit. The Permittees shall submit an application for a new Permit at least one hundred eighty (180) calendar days before the expiration date of this Permit. [20.4.1.900 NMAC (incorporating 40 CFR §§270.10(h), 270.30(b))]

I.E.4. Continuation of Expiring Permits

If the Permittees have submitted a timely and complete application for renewal of this Permit as specified in 20.4.1.900 NMAC (incorporating 40 CFR §§270.10, 270.13 through 270.29), this Permit shall remain in effect until the effective date of the new Permit if, through no fault of the Permittees, the Secretary has not issued a new Permit on or before the expiration date of this Permit. [20.4.1.900 NMAC (incorporating 40 CFR §270.51)]

I.E.5. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Permittees in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit. [20.4.1.900 NMAC (incorporating 40 CFR §270.30(c))]

I.E.6. Duty to Mitigate

In the event of noncompliance with this Permit, the Permittees shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment. [20.4.1.900 NMAC (incorporating 40 CFR §270.30(d))]

I.E.7. Proper Operation and Maintenance

The Permittees shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittees to achieve compliance with the conditions of this Permit. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Permit. [20.4.1.900 NMAC (incorporating 40 CFR §270.30(e))]

I.E.8. Duty to Provide Information

The Permittees shall furnish to the Secretary, within a reasonable time frame as specified by the Secretary, any relevant information which the Secretary may request to determine whether cause exists for modifying, suspending, or revoking this Permit, or to determine compliance with this Permit. The Permittees shall also furnish to the Secretary, upon request, copies of records required to be kept by this Permit. [20.4.1.500 and .900 NMAC (incorporating 40 CFR §§264.74(a) and 270.30(h))]

I.E.9. Inspection and Entry

The Permittees shall allow the Secretary, or authorized representatives, upon the presentation of credentials and other documents as may be required by law, the following inspection and entry privileges specified in 20.4.1.900 NMAC (incorporating 40 CFR §270.30(i)):

I.E.9.a. Entrance to premises - to enter at reasonable times upon the Permittees' premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Permit;

I.E.9.b. Access to records - to have access to and copy, at reasonable times, any records that must be kept under the conditions of this Permit;

I.E.9.c. Inspection - to inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

I.E.9.d. Sampling - to sample or monitor at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by RCRA and/or HWA, any substances or parameters at any location. If the Secretary obtains any sample, prior to leaving the premises the Secretary shall give the Permittees a receipt describing the sample obtained and, if requested, a portion of each sample of equal weight or volume to the portion retained. If any analysis is made of the sample, the Secretary shall promptly furnish a copy of the results of the analysis to the Permittees.

Permit Condition I.E.9 shall not be construed to limit, in any manner, the Secretary's authority under Section 74-4-4.3 of the HWA.

I.E.10. Monitoring and Records

I.E.10.a. Representative sampling - for the purposes of monitoring, the Permittees shall take samples and measurements representative of the monitored activity. [20.4.1.900 NMAC (incorporating 40 CFR §270.30(j)(1))]

I.E.10.b. Record retention - the Permittees shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this Permit, the waste minimization certification required by 20.4.1.500 NMAC (incorporating 40 CFR §264.73(b)(9)), and records of all data used to complete the application for this Permit for a period of at least 3 years from the date of the sample, measurement, report, record, certification, or application. The Secretary may extend these periods at any time, and these periods shall be automatically extended during the course of any unresolved enforcement action regarding this facility. The Permittees shall maintain records from all ground-water monitoring wells and associated ground-water surface elevations, during the active life of the facility and the post-closure period. [20.4.1.500 and .900 NMAC (incorporating 40 CFR §§264.74(b) and 270.30(j)(2))]

I.E.10.c. Monitoring records contents - as specified by 20.4.1.900 NMAC (incorporating 40 CFR §270.30(j)(3)), records of monitoring information shall include:

i. The dates, exact place, and times of sampling or measurements;

ii. The individuals who performed the sampling or measurements;

iii. The dates analyses were performed;

iv. The individuals who performed the analyses;

v. The analytical techniques or methods used; and

vi. The results of such analyses.

I.E.11. Reporting Requirements

I.E.11.a. Reporting Planned Changes - the Permittees shall give notice to the Secretary, as soon as possible, of any planned physical alterations or additions to the permitted facility. [20.4.1.900 NMAC (incorporating 40 CFR §270.30(l)(1))]

I.E.11.b. Reporting Anticipated Noncompliance - the Permittees shall give advance notice to the Secretary of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The Permittees shall not store or dispose TRU mixed waste in any modified portion of the facility (except as provided in 20.4.1.900 NMAC (incorporating 40 CFR §270.42)) until the following conditions specified in 20.4.1.900 NMAC (incorporating 40 CFR §270.30(l)(2)) are satisfied:

i. the Permittees have submitted to the Secretary, by certified mail or hand delivery, a letter signed by the Permittees and a New Mexico registered professional engineer stating that the facility has been constructed or modified in compliance with this Permit, and:

ii. the Secretary has either inspected the modified portion of the facility and finds it is in compliance with the conditions of this Permit; or waived the inspection or, within fifteen (15) calendar days of the date of submission of the letter required above, has not notified the Permittees of his intent to inspect.

I.E.12. <u>Transfer of Permits</u>

The Permittees shall not transfer this Permit to any person, except after notice to the Secretary. The Secretary shall require modification or revocation and reissuance of this Permit as specified by 20.4.1.900 NMAC (incorporating 40 CFR §270.40). Before transferring ownership or operation of the facility during its active life or post-closure care period, the Permittees shall notify the new owner or operator in writing as required by 20.4.1.500 and .900 NMAC (incorporating 40 CFR §§264.12(c) and 270.30(l)(3)).

I.E.13. <u>Twenty-Four Hour and Subsequent Reporting</u>

I.E.13.a. <u>Oral report</u> - as required by 20.4.1.900 NMAC (incorporating 40 CFR §270.30(l)(6)(i)), within twenty four (24) hours from the time the Permittees become aware of the circumstances, the Permittees shall report orally to the Secretary any noncompliance which may endanger human health or the environment, including:

i. Information concerning release of any TRU mixed or hazardous waste that may cause an endangerment to public drinking water supplies; and

ii. Any information of a release or discharge of TRU mixed or hazardous waste, or of a fire or explosion from the facility, which could threaten the environment or human health outside the facility.

I.E.13.b. <u>Description of occurrence</u> - the description of the occurrence and its cause shall include:

i. Name, address, and telephone number of the Permittees;

ii. Name, address, and telephone number of the facility;

iii. Date, time, and type of incident;

iv. Name and quantity of materials involved;

v. The extent of injuries, if any;

vi. An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and

vii. Estimated quantity and disposition of recovered material that resulted from the incident.

I.E.13.c. Written notice - as required by 20.4.1.900 NMAC (incorporating 40 CFR §270.30(l)(6)(iii)), the Permittees shall submit a written notice within five (5) calendar days of the time the Permittees become aware of the circumstances. The written notice shall contain the following information:

i. a description of the noncompliance and its cause;

ii. the period(s) of the noncompliance including exact dates and times and, if the noncompliance has not been corrected, the anticipated time it is expected to continue; and

iii. steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

The Secretary may waive the five-day written notice requirement in favor of a written report within fifteen (15) calendar days.

I.E.13.d. Contingency Plan implementation - if the Contingency Plan is implemented, the Permittees shall comply with the reporting requirements specified in Permit Attachment F (RCRA Contingency Plan). [20.4.1.500 NMAC (incorporating 40 CFR §264.56(j))]

I.E.14. Other Noncompliance

The Permittees shall report to the Secretary all other instances of noncompliance not otherwise required to be reported above, in Permit Conditions I.E.10 through I.E.13, at the time monitoring reports are submitted. The reports shall contain the information specified in Permit Condition I.E.13. and 20.4.1.900 NMAC (incorporating 40 CFR §270.30(l)(10)).

I.E.15. Other Information

Whenever the Permittees become aware that they failed to submit any relevant facts in the Permit application, or submitted incorrect information in the Permit application or in any report to the Secretary, the Permittees shall promptly submit such facts or information in writing to the Secretary. [20.4.1.900 NMAC (incorporating 40 CFR §270.30(l)(11))]

I.F. SIGNATORY REQUIREMENT

The Permittees shall sign and certify, as specified in 20.4.1.900 NMAC (incorporating 40 CFR §270.11) all applications, reports required by this Permit, or information submitted to or requested by the Secretary. [20.4.1.900 NMAC (incorporating 40 CFR §270.30(k))]

I.G. REPORTS, NOTIFICATIONS, AND SUBMISSIONS TO THE SECRETARY

The Permittees shall submit, by certified mail or hand delivery, all reports, notifications, or other submissions which are submitted to or requested by the Secretary or required by this Permit, to:

Hazardous Waste Permits Program Manager
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

Telephone Number: (505) 428-2500
Facsimile Number: (505) 428-2567

I.H. CONFIDENTIAL INFORMATION

The Permittees may claim confidentiality for any information submitted to or requested by the Secretary or required by this Permit, to the extent authorized by Section 74-4-4.3(D) of the HWA and 20.4.1.900 NMAC (incorporating 40 CFR §270.12).

I.I. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The Permittees shall maintain at the facility, until closed as specified in Module II, the following documents and all amendments, revisions and modifications to these documents:

1. Waste Analysis Plan, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.13(b)) and this Permit, and records and results of waste analyses performed as specified in 20.4.1.500 NMAC (incorporating 40 CFR §264.13).

2. Inspection schedules, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.15(b)(2)) and this Permit, and records and results of

inspections as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.15(d)).

3. Personnel training documents and records, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.16(d)) and this Permit.

4. Contingency Plan, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.53(a)) and this Permit, including summary reports and details of all incidents that require implementation of the contingency plan as specified in 20.4.1.500 NMAC (incorporating 40 CFR §264.56(j)).

5. Operating record, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.73) and this Permit.

6. Closure Plan, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.112(a)) and this Permit.

7. Post-Closure Plan as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.118(a)) and this Permit.

8. Procedures for limiting air emissions, as required by 20.4.1.500 and .900 NMAC (incorporating 40 CFR §§264.601(c) and 270.23(a)(2)) and this Permit.

9. All other documents required by Module I, Permit Condition I.E.10, and Module II.

I.J. DOCUMENTS TO BE SUBMITTED TO THE SECRETARY

The Permittees shall submit the Mine Ventilation Rate Monitoring Plan to the Secretary in accordance with the compliance schedule specified in Permit Condition IV.J.

I.K. DISPUTE RESOLUTION

I.K.1. Applicability

In the event the Permittees disagree, in whole or in part, with either an audit determination by NMED (as specified in Permit Condition II.C.2.d) or an evaluation by NMED of the Permittees' provisional approval of an AK Sufficiency Determination Request for a particular waste stream (as specified in Permit Attachment B), the Permittees may seek dispute resolution. The dispute resolution procedure in this Permit Condition shall be the exclusive mechanism for resolving disputes related to NMED's audit determination or a determination that the Permittees' provisional approval for a particular waste stream is inadequate.

I.K.2. Notice to NMED

To invoke dispute resolution, the Permittees shall notify NMED in writing within seven (7) calendar days of receipt of the determination in dispute. Such notice shall be sent to the Hazardous Waste Bureau Chief and must set forth the specific matters in dispute, the position the Permittees assert should be adopted, a detailed explanation for the Permittees' position, and any other matters considered necessary for the dispute resolution. For AK Sufficiency Determination disputes, the Permittees shall submit all factual data, analysis, opinion, and other documentation upon which they relied for their provisional approval, and any other information that supports their position. NMED shall acknowledge receipt of notification by e-mail sent to the Permittees' representative as designated in their written notification.

I.K.3. Tier I - Informal Negotiations

The Permittees and NMED shall make all reasonable, good faith efforts to informally resolve disputes related to NMED's determination. The Permittees and NMED shall meet or teleconference within fifteen (15) calendar days from NMED's receipt of notification to commence negotiations to resolve the dispute. The Permittees and NMED shall have thirty (30) calendar days from NMED's receipt of notification to resolve the dispute. In the event agreement is reached, the Permittees shall comply with the terms of such agreement or, if appropriate, submit a revised submittal and implement the same in accordance with, and within the time frame specified in, such agreement.

I.K.4. Tier II - Final Decision of the Secretary

In the event agreement is not reached within the thirty (30) calendar day period, the Permittees may submit a written Request for Final Decision to the Secretary. The Request must be submitted within five (5) calendar days of the end of Tier I Informal Negotiation period. The Secretary will notify the Permittees in writing of the decision on the dispute, and the Permittees shall comply with the terms and conditions of the decision. Such decision shall be the final resolution of the dispute and shall be an enforceable Order under this Permit. The Permittees shall implement the decision in accordance with, and within the time frame specified in, such decision.

I.K.5. Actions Not Affected by Dispute

With the exception of those matters under dispute, the Permittees shall proceed to take any action required by those portions of the submission and of this Permit that NMED determines are not affected by the dispute.

PERMIT ATTACHMENTS

Permit Attachment F (as modified from WIPP RCRA Part B Permit Application, "RCRA Contingency Plan" - Chapter G).

II. MODULE II - GENERAL FACILITY CONDITIONS

II.A. DESIGN AND OPERATION OF FACILITY

The Permittees shall design, construct, maintain, and operate WIPP to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of transuranic (**TRU**) mixed waste or mixed waste constituents to air, soil, groundwater, or surface water which could threaten human health or the environment, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.31).

II.B. WASTE SOURCES

II.B.1. Off-site Wastes

The Permittees may receive off-site TRU mixed waste in compliance with the requirements and conditions specified in this Permit. The Permittees may only receive TRU mixed waste from those sites which comply with the applicable requirements of the Waste Analysis Plan (**WAP**) specified in Permit Condition II.C.1 and Permit Attachment B, as required by 20.4.1.500 NMAC (incorporating 40 CFR 264.13(a)) and as verified through the Permittees' Audit and Surveillance Program specified in Permit Condition II.C.2.

II.B.2. Required Notification to Off-Site Sources

Before the Permittees receive TRU mixed waste from an off-site source for the first time, they shall inform the generator/storage site in writing that they have the appropriate Permits for, and will accept, the waste the generator/storage site is shipping. The Permittees shall keep a copy of this written notice as part of the operating record, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.12(b)).

II.C. GENERAL WASTE ANALYSIS

II.C.1. Waste Analysis Plan

The Permittees shall not manage, store, or dispose TRU mixed waste at WIPP which fails to meet the characterization requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.13), as specified by this Permit.

The Permittees' WAP, as specified in Permit Attachment B, is approved subject to the following conditions:

II.C.1.a. Implementation of requirements

i. ~~the~~ The Permittees shall require that generator/storage sites implement applicable waste characterization requirements of the WAP, specified in Permit Attachment B, prior to the Permittees' receipt of TRU mixed waste from a generator/storage site.

ii. The Permittees shall implement applicable waste confirmation requirements of the WAP, ~~screen, verify, and examine TRU mixed waste shipments in accordance with~~ specified in Permit Attachment B7, ~~Section B7-1b,~~ prior to storage or disposal of TRU mixed waste at ~~the~~ WIPP.

II.C.1.b. Waste characterization sampling and analytical methods - the Permittees shall require that generator/storage sites and Permittee approved laboratories comply with the applicable method requirements, quality control, equipment testing, inspection, maintenance, and equipment calibration and frequency standards for the procedures specified in Permit Attachment B1 (Waste Characterization Sampling Methods). For all analytical methods for waste analysis not otherwise specified in Permit Attachment B1, the Permittees shall require the generator/storage sites and Permittee approved laboratories to use "*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*", EPA Publication SW-846. Updates to EPA Publication SW-846 shall be incorporated into this permit by reference. Sites may use these new or revised methods once they have demonstrated that the results from the new methods will be at least equivalent to the results from the currently used methods.

II.C.1.c. Statistical methods used in sampling and analysis - the Permittees shall require that generator/storage sites use the methods for statistically selecting retrievably stored and newly-generated TRU mixed waste containers for visual examination and volatile organic compounds (**VOCs**), semivolatile organic compounds (**SVOCs**), and total metals analysis, establishing upper confidence limits, and, when demonstrated appropriate, control charting for newly-generated waste stream sampling specified in Permit Attachment B2 (Statistical Methods Used in Sampling and Analysis).

II.C.1.d. Quality assurance objectives - the Permittees shall require that all waste characterization activities used by generator/storage sites and Permittee approved laboratories comply with the appropriate quality assurance objectives (**QAOs**) specified in

Permit Attachment B3 (Quality Assurance Objectives and Data Validation Techniques for Waste Characterization Sampling and Analytical Methods). The Permittees shall require generator/storage sites to review, validate, and verify all analytical data; reconcile analytical results with data quality objectives (**DQOs**); satisfy data reporting requirements; and identify, document, and report all nonconformances and operational variances in compliance with Permit Attachment B3.

II.C.1.e. Acceptable knowledge - the Permittees shall require generator/storage sites to assemble acceptable knowledge documentation and ~~confirm~~ verify acceptable knowledge determinations, and shall audit (as specified in Permit Condition II.C.2) all aspects of the acceptable knowledge waste characterization process as specified in Permit Attachment B4 (TRU Mixed Waste Characterization Using Acceptable Knowledge).

II.C.1.f. Quality assurance - the Permittees shall require each generator/storage site and Permittee approved laboratory to develop and implement a quality assurance project plan (**QAPjP**) which demonstrates compliance with, and implementation of, applicable requirements of the WAP, Permit Attachment B, as specified in Permit Attachment B5 (Quality Assurance Project Plan Requirements).

II.C.1.g. WIPP Waste Information System (**WWIS**) database - the Permittees shall provide the Secretary access to the WWIS database as necessary to determine compliance with the WAP. The WWIS shall meet all requirements presented in Section B-4b(1)(i) of the WAP, Permit Attachment B, prior to acceptance of TRU mixed waste. The Secretary's access to the WWIS shall be direct, read-only (via modem or Internet) to all query and reporting functions of the Characterization, Certification, Shipping, and Inventory modules of the WWIS database.

II.C.2. Audit and Surveillance Program

The Permittees shall not manage, store, or dispose TRU mixed waste at WIPP from a generator/storage site until the following conditions have been met as necessary for the Secretary to determine that the applicable characterization requirements of Permit Condition II.C.1 have been implemented:

II.C.2.a. Requirement to audit - the Permittees shall demonstrate to the Secretary that the generator/storage sites and Permittee approved laboratories~~ (when applicable)~~ have implemented and comply with applicable requirements of the WAP by conducting~~ an~~ audits~~ of the generator/storage sites~~ as specified in Permit Attachment B, Section B-4b(1)(iii), and Permit Attachment B6 (Waste Isolation Pilot Plant Permittees' Audit and Surveillance Program), and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.13).

II.C.2.b. Observation of audit - the Secretary may observe such audits as necessary to validate the implementation of and compliance with applicable WAP requirements at each generator/storage site and Permittee approved laboratory. The Permittees shall provide the Secretary with a current audit schedule on a monthly basis and notify the Secretary no later than thirty (30) calendar days prior to each audit.

II.C.2.c. Final audit report - the Permittees shall provide the Secretary a final audit report as specified in Permit Attachment B6. The final audit report shall include all information specified in Permit Attachment B6, Section B6-4, and:

i. A detailed description of all corrective actions and the resolution of any corrective action applicable to WAP requirements, including re-audits if required;

ii. All documentation necessary for the Secretary to determine if the corrective action was resolved.

II.C.2.d. Secretary notification of approval - the Secretary shall approve the Permittees' final audit report by written notification to the Permittees that the applicable characterization requirements of the WAP at a generator/storage site~~ and~~ or Permittee approved laboratory~~ (when applicable)~~ have been implemented.

II.C.3. Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (**TSDF-WAC**)

The Permittees shall not accept TRU mixed wastes at WIPP for storage, management, or disposal which fail to meet the treatment, storage, and disposal facility waste acceptance criteria as presented in Permit Conditions II.C.3.a through II.C.3.l of this Permit.

II.C.3.a. Liquids - liquid waste is not acceptable at WIPP. Waste shall contain as little residual liquid as is reasonably achievable by pouring, pumping and/or aspirating, and internal containers shall contain less than 1 inch or 2.5 centimeters of liquid in the bottom of the container. Total residual liquid in any payload container (e.g., 55-gallon drum, standard waste box, etc.) may not exceed 1 percent volume of that container.

II.C.3.b. Pyrophoric materials - non-radionuclide pyrophoric materials, such as elemental potassium, are not acceptable at WIPP.

II.C.3.c. Non-mixed hazardous wastes - hazardous wastes not occurring as co-contaminants with TRU wastes (non-mixed hazardous wastes) are not acceptable at WIPP.

II.C.3.d. Chemical incompatibility - wastes incompatible with backfill, seal and panel closures materials, container and packaging materials, shipping container materials, or other wastes are not acceptable at WIPP.

II.C.3.e. Explosives and compressed gases - wastes containing explosives or compressed gases are not acceptable at WIPP.

II.C.3.f. PCB waste - wastes with polychlorinated biphenyls (**PCBs**) not authorized under an EPA PCB waste disposal authorization are not acceptable at WIPP.

II.C.3.g. Ignitable, corrosive, and reactive wastes - wastes exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA Hazardous Waste Numbers of D001, D002, or D003) are not acceptable at WIPP.

~~II.C.3.h. Remote-handled transuranic waste - remote-handled (**RH**) TRU mixed waste (waste with a surface dose rate of 200 millirem per hour or greater) is not acceptable at WIPP.~~

II.C.3.i. Excluded waste - TRU mixed waste that has ever been managed as high-level waste and waste from tanks specified in Permit Attachment B are not acceptable at WIPP unless specifically approved through a Class 3 permit modification. Such wastes are listed in Table II.C.3.i below.

Table II.C.3.i - Additional Approved Waste Streams	
Date Class 3 Permit Modification Request Approved	**Description of Waste Stream**

~~II.C.3.j. Headspace gas sampling and analysis - any waste container that does not have VOC concentration values reported for the headspace is not acceptable at WIPP.~~

II.C.3.k. Radiographic / visual examination - any waste container from a waste stream (or waste stream lot) which has not undergone either radiographic or visual examination of a statistically representative subpopulation of the waste stream in each shipment, as described in Permit Attachment B7~~, Section B7-1b,~~ is not acceptable at WIPP.

II.C.3.l. Waste stream profiles - any waste container from a waste stream which has not been preceded by an appropriate, certified Waste Stream Profile Form (Attachment B, Figure B-1) is not acceptable at WIPP.

II.C.4. Permitted TRU Mixed Wastes

The Permittees shall accept containers which contain only those TRU mixed wastes listed in the Hazardous Waste Permit Application Part A, Permit Attachment O. Allowable TRU mixed wastes are specified in Table II.C.4 below. Some of the waste may also be identified by unique state hazardous waste codes. These wastes are acceptable at WIPP as long as the TSDF-WAC are met:

Table II.C.4 - Permitted TRU Mixed Wastes		
EPA Hazardous Waste Code	**Hazardous Waste[1]**	**Chemical Abstract Number**
F001	Spent halogenated solvents: Tetrachloroethylene Trichloroethylene Methylene chloride 1,1,1-Trichloroethane Carbon tetrachloride Chlorinated fluorocarbons	 127-18-4 79-01-6 75-09-2 71-55-6 56-23-5 NA

Table II.C.4 - Permitted TRU Mixed Wastes		
EPA Hazardous Waste Code	**Hazardous Waste[1]**	**Chemical Abstract Number**
F002	Spent halogenated solvents: Tetrachloroethylene Methylene chloride Trichloroethylene 1,1,1-Trichloroethane Chlorobenzene 1,1,2-Trichloro-1,2,2-trifluoroethane Ortho-dichlorobenzene Trichlorofluoromethane 1,1,2-Trichloroethane	 127-18-4 75-09-2 79-01-6 71-55-6 108-90-7 76-13-1 95-50-1 75-69-4 79-00-5
F003	Spent non-halogenated solvents: Xylene Acetone Ethyl acetate Ethyl benzene Ethyl ether Methyl isobutyl ketone n-Butyl alcohol Cyclohexanone Methanol	 1330-20-7 67-64-1 141-78-6 100-41-4 60-29-7 108-10-1 71-36-3 108-94-1 67-56-1
F004	Spent non-halogenated solvents: Cresols and cresylic acid Nitrobenzene	 1319-77-3 98-95-3
F005	Spent non-halogenated solvents: Toluene Methyl ethyl ketone Carbon disulfide Isobutanol Pyridine Benzene 2-Ethoxyethanol 2-Nitropropane	 108-88-3 78-93-3 75-15-0 78-83-1 110-86-1 71-43-2 110-80-5 79-46-9
F006	Wastewater treatment sludges from electroplating operations: Cadmium Chromium Cyanide Lead Nickel Silver	 7440-43-9 7440-47-3 57-12-5 7439-92-1 7440-02-0 7440-22-4
F007	Spent cyanide plating bath solutions from electroplating operations: See F006	

Table II.C.4 - Permitted TRU Mixed Wastes		
EPA Hazardous Waste Code	**Hazardous Waste[1]**	**Chemical Abstract Number**
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process: See F006	
D004	Arsenic	7440-38-2
D005	Barium	7440-39-3
D006	Cadmium	7440-43-9
D007	Chromium	7440-47-3
D008	Lead	7439-92-1
D009	Mercury	7439-97-6
D010	Selenium	7782-49-2
D011	Silver	7440-22-4
D018	Benzene	71-43-2
D019	Carbon Tetrachloride	56-23-5
D021	Chlorobenzene	108-90-7
D022	Chloroform	67-66-3
D026	Cresol	1319-77-3
D027	1,4-Dichlorobenzene	106-46-7
D028	1,2-Dichloroethane	107-06-2
D029	1,1-Dichloroethylene	75-35-4
D030	2,4-Dinitrotoluene	121-14-2
D032	Hexachlorobenzene	118-74-1
D033	Hexachlorobutadiene	87-68-3
D034	Hexachloroethane	67-72-1
D035	Methyl ethyl ketone	78-93-3
D036	Nitrobenzene	98-95-3
D037	Pentachlorophenol	87-86-5
D038	Pyridine	110-86-1
D039	Tetrachloroethylene	127-18-4
D040	Trichloroethylene	79-01-6
D043	Vinyl chloride	75-01-4
P015	Beryllium powder (H)	7440-41-7
P030	Cyanides (soluble cyanide salts), not otherwise specified (H)	N/A
P098	Potassium Cyanide (H)	151-50-8
P099	Potassium Silver Cyanide (H)	506-61-6
P106	Sodium Cyanide (H)	143-33-9
P120	Vanadium Pentoxide (H)	1314-62-1

Table II.C.4 - Permitted TRU Mixed Wastes		
EPA Hazardous Waste Code	**Hazardous Waste[1]**	**Chemical Abstract Number**
U002	Acetone (I)	67-64-1
U003	Acetonitrile (I,T)	75-05-8
U019	Benzene (I,T)	71-43-2
U037	Chlorobenzene (T)	108-90-7
U043	Vinyl Chloride (T)	75-01-4
U044	Chloroform (T)	67-66-3
U052	Cresol (T)	1319-77-3
U070	1,2-Dichlorobenzene (T)	95-50-1
U072	1,4-Dichlorobenzene (T)	106-46-7
U078	1,1-Dichloroethylene (T)	75-35-4
U079	1,2-Dichloroethylene (T)	156-60-5
U103	Dimethyl Sulfate (T)	77-78-1
U105	2,4-Dinitrotoluene (T)	121-14-2
U108	1,4-Dioxane (T)	123-91-1
U122	Formaldehyde (T)	50-00-0
U133	Hydrazine (R,T)	302-01-2
U134	Hydrofluoric Acid (C,T)	7664-39-3
U151	Mercury (T)	7439-97-6
U154	Methanol (I)	67-56-1
U159	Methyl Ethyl Ketone (I,T)	78-93-3
U196	Pyridine (T)	110-86-1
U209	1,1,2,2-Tetrachloroethane (T)	79-34-5
U210	Tetrachloroethylene (T)	127-18-4
U220	Toluene (T)	108-88-3
U226	1,1,1-Trichloroethane (T)	71-55-6
U228	Trichloroethylene (T)	79-01-6
U239	Xylene (I,T)	1330-20-7

[1] Designations in parentheses for P- and U-coded wastes reflect the basis for the listing and are as follows:

H - acute toxicity
T - toxicity
R - reactivity
I - ignitability
C - corrosivity

Acceptance of U-coded wastes listed for reactivity, ignitability, or corrosivity characteristics is contingent upon a demonstration that the wastes meet the requirements specified in Permit Condition II.C.3.g.

II.C.5. Derived Waste

Any WIPP-generated waste derived from adequately characterized, WIPP-accepted TRU mixed waste generated at an off-site facility (*derived waste*) does not need to be additionally characterized for hazardous waste components if the Permittees use the generator's characterization data and knowledge of the processes at the WIPP facility to identify and characterize derived waste. Derived waste containers shall be managed according to Permit Attachment M1, Section M1-1d(1), and meet all TSDF waste acceptance criteria in Permit Condition II.C.3 prior to disposal at WIPP.

II.D. SECURITY

In order to prevent the unknowing entry, and minimize the possibility of unauthorized entry, of persons or livestock onto the active portion of the facility, the Permittees shall comply with the security provisions specified in Permit Attachment C (Security), as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.14).

II.E. GENERAL INSPECTION REQUIREMENTS

II.E.1. Inspection Schedule

The Permittees shall implement the inspection schedule specified in Permit Attachment D (Inspections) to detect any malfunctions and deteriorations, operator errors, and discharges, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.15(b)).

II.E.2. Inspection Log Forms

The Permittees shall use the inspection logbooks and forms as specified in Permit Attachment D (Inspection Schedule/Procedures). Original copies of these completed forms are maintained in the Operating Record. The Permittees shall record the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.15(d)).

II.E.3. Inspection Frequency

The Permittees shall inspect monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment at the frequency specified in Tables D-1 and D-2 of Permit Attachment D, and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.15(b)).

II.E.4. Inspection Remediation

The Permittees shall remedy any deterioration or malfunction of equipment or structures which an inspection reveals, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.15(c)).

II.E.5. Inspection Records

The Permittees shall maintain inspection logbooks and forms in the operating record for at least three (3) years from the date of inspection, as required by 20.4.1.500 NMAC (incorporating 40 CFR §§264.15(d) and 264.73(b)(5)).

II.F. PERSONNEL TRAINING

The Permittees shall conduct personnel training, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.16).

II.F.1. Personnel Training Content

The personnel training program shall include the requirements specified in Permit Attachment H (Personnel Training) and Permit Attachment H2 (Training Course and Qualification/Certification Card Outlines), as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.16).

II.F.2. Personnel Training Requirements

The Permittees shall train all persons involved in the management of mixed and hazardous waste in procedures relevant to the positions in which they are employed, as specified in Permit Attachment H1 (RCRA Hazardous Waste Management Job Titles and Descriptions), and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.16).

II.F.3. Personnel Training Records

The Permittees shall maintain training documents and records, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.16(d) and (e)).

II.G. GENERAL REQUIREMENTS FOR HANDLING IGNITABLE, CORROSIVE, REACTIVE, OR INCOMPATIBLE WASTES

The Permittees shall not manage, store or dispose of ignitable, corrosive, reactive, or incompatible wastes, as defined in 20.4.1.200 NMAC (incorporating 40 CFR §§261.21, 261.22, and 261.23) and 20.4.1.500 NMAC (incorporating 40 CFR §264 Appendix V) within the permitted units. The Permittees shall comply with the procedures to prevent acceptance of ignitable, corrosive, reactive, and incompatible waste specified in Permit Conditions II.C.1 and II.C.3.

II.H. PREPAREDNESS AND PREVENTION

II.H.1. Required Equipment

The Permittees shall maintain at the facility the equipment specified in the Contingency Plan, Permit Attachment F (RCRA Contingency Plan), as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.32.)

II.H.2. Testing and Maintenance of Equipment

The Permittees shall test and maintain the equipment specified in Permit Condition II.H.1, as necessary, to assure its proper operation in time of emergency, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.33).

II.H.3. Access to Communications or Alarm System

The Permittees shall maintain access to the communications or alarm system, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.34).

II.H.4. Required Aisle Space

The Permittees shall maintain aisle space in the WHB Unit and Parking Area Unit (Module III) to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.35).

II.H.5. Arrangements with Local Authorities

II.H.5.a. Parties to arrangements - The Permittees shall maintain preparedness and prevention arrangements with state and local authorities, other mining operations, contractors, and other governmental agencies specified in Permit Attachment F, Section F-6, as required by 20.4.1.500 NMAC (incorporating 40 CFR §§264.37(a) and 264.52(c)). If state or local authorities, other mining operations, contractors, or other governmental agencies decline to enter into preparedness and prevention arrangements with the Permittees, the Permittees shall document this refusal in the operating record, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.37(b)).

II.H.5.b. Coordination agreements - as specified in Section F-6 of Permit Attachment F, these arrangements shall be either Memoranda of Understanding (**MOU**) or Mutual Aid Agreements (**MAA**) between the Permittees and the off-site cooperating agencies, and shall include the elements required by 20.4.1.500 NMAC (incorporating 40 CFR §264.37(a)). Copies and descriptions of these MOUs and agreements shall be maintained at the facility in the operating record.

II.I. CONTINGENCY PLAN

II.I.1. Implementation of Plan

The Permittees shall immediately implement the Contingency Plan as specified in Permit Attachment F whenever there is a fire, explosion, or release of mixed or hazardous waste or hazardous waste constituents which could threaten human health or the environment, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.51(b)).

II.I.2. Copies of Plan

The Permittees shall maintain copies of the Contingency Plan and all revisions and amendments to the Contingency Plan as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.53). The Permittees shall provide copies of the current Contingency Plan and all revisions to the Contingency Plan through an electronic controlled document distribution system or in appropriate controlled-document locations at the facility, and to the Secretary and all entities with which the Permittees have emergency MOUs or MAAs, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.53(b)). The Permittees shall maintain at least one current controlled-document paper copy of the Contingency Plan at the facility in a location readily accessible to the Emergency Coordinator specified in Permit Condition II.I.4.

II.I.3. Amendments to Plan

The Permittees shall review and immediately amend, if necessary, the Contingency Plan, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.54).

II.I.4. Emergency Coordinator

An Emergency Coordinator as specified in Table F-2 of Permit Attachment F shall be available at all times in case of an emergency. The Emergency Coordinator shall be thoroughly familiar with the Contingency Plan and shall have the authority to commit the resources needed to implement the Contingency Plan, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.55). In the event of an imminent or actual emergency, the Emergency Coordinator shall 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. 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.

II.L.3. Notification of Closure

The Permittees shall notify the Secretary in writing at least sixty (60) calendar days prior to the date on which they expect to begin partial closure, i.e., closure of an Underground Hazardous Waste Disposal Unit (**Underground HWDU**), or final closure of the facility as required by 20.4.1.500 NMAC (incorporating 40 CFR §§264.112(d) and 264.601).

II.L.4. Time Allowed For Closure

II.L.4.a. Partial closure - Upon completion of disposal operations in an Underground HWDU, the Permittees shall complete partial closure activities as specified in the Closure Plan, Permit Attachment I, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.113).

II.L.4.b. Final facility closure - After receiving the final volume of TRU mixed waste, the Permittees shall remove from the facility all non-mixed hazardous waste, dispose in the Underground HWDUs all TRU-mixed hazardous waste and derived waste, and shall complete closure activities as specified in the Closure Plan, Permit Attachment I, and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.113).

II.L.5. Disposal or Decontamination of Equipment, Structures, and Soils

The Permittees shall decontaminate or dispose of all contaminated equipment, structures, and soils, as specified in the Closure Plan, Permit Attachment I, and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.114).

II.L.6. Certification of Closure

Within sixty (60) calendar days of completion of closure of each Underground HWDU, and within sixty (60) calendar days of completion of final closure, the Permittees shall certify in writing to the Secretary that the Underground HWDUs and/or facility have been closed as specified in the Closure Plan, Permit Attachment I, and as required by 20.4.1.500 NMAC (incorporating 40 CFR §§264.115 and 264.601).

II.L.7. Survey Plat

No later than the submission of the certification of closure of each Underground HWDU, the Permittees shall submit a survey plat detailing the location and dimensions of each Underground HWDU with respect to permanently surveyed benchmarks, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.116).

II.M. GENERAL POST-CLOSURE REQUIREMENTS

General post-closure care requirements are specified in Permit Module VI, Post-Closure Care Plan.

PERMIT ATTACHMENTS

Permit Attachment B (as modified from WIPP RCRA Part B Permit Application, "Waste Analysis Plan" - Chapter C).

Permit Attachment B1 (as modified from WIPP RCRA Part B Permit Application, "Waste Characterization Sampling Methods" - Appendix C4).

Permit Attachment B2 (as modified from WIPP RCRA Part B Permit Application, "Statistical Methods Used in Sampling and Analysis" - Appendix C6).

Permit Attachment B3 (as modified from WIPP RCRA Part B Permit Application, "Quality Assurance Objectives and Data Validation Techniques for Waste Characterization Sampling and Analytical Methods" - Appendix C8).

Permit Attachment B4 (as modified from WIPP RCRA Part B Permit Application, "TRU Waste Characterization Using Acceptable Knowledge" - Appendix C9).

Permit Attachment B5 (as modified from WIPP RCRA Part B Permit Application, "Quality Assurance Project Plan Requirements" - Appendix C10).

Permit Attachment B6 (as modified from WIPP RCRA Part B Permit Application, "Waste Isolation Pilot Plant Generator/Storage Site Waste Screening and Acceptance Audit Program" - Appendix C11).

Permit Attachment B7 (as ~~first included~~ modified from the Class 3 permit modification request addressing Section 311 Pub. L. 108-137, Section 310 Pub. L. 108-447, and Remote Handled Waste, June 10, 2005 and September 22, 2005).

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

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

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

Permit Attachment F (as modified from WIPP RCRA Part B Permit Application, "RCRA Contingency Plan" - Chapter G).

Permit Attachment H (as modified from WIPP RCRA Part B Permit Application, "Personnel Training" - Chapter H).

Permit Attachment H1 (as modified from WIPP RCRA Part B Permit Application, "List of Hazardous Waste Management Job Titles" - Appendix

H1, and "Waste Isolation Pilot Plant RCRA Hazardous Waste Management Functional Job Descriptions" - Appendix H2).

Permit Attachment H2 (as modified from WIPP RCRA Part B Permit Application, "Training Course and Qualification/Certification Card Outlines" - Appendix H3).

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, "Technical Specifications, Panel Closure System, Waste Isolation Pilot Plant" - Appendix I1).

Permit Attachment I2 (as modified from WIPP RCRA Part B Permit Application, "Shaft Sealing System Compliance Submittal Design Report" - Appendix 2).

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

Permit Attachment J1 (as modified from WIPP RCRA Part B Permit Application, "Active Institutional Controls" - Appendix I4).

Permit Attachment O (as modified from WIPP RCRA Part B Permit Application, "Hazardous Waste Permit Application Part A" - Chapter A).

III. MODULE III - CONTAINER STORAGE

III.A. DESIGNATED CONTAINER STORAGE UNITS

This Module authorizes the storage and management of ~~contact-handled (**CH**)~~ transuranic (**TRU**) mixed waste containers in the Waste Handling Building and Parking Area Container Storage Units described below. Specific facility and process information for the storage and management of ~~CH~~ TRU mixed waste in these Container Storage Units is incorporated in Permit Attachment M1 (Container Storage).

III.A.1. Waste Handling Building Container Storage Unit

The Waste Handling Building Container Storage Unit (**WHB Unit**) is located in the Waste Handling Building (**WHB**) at the WIPP facility. The WHB Unit consists of the WHB contact-handled (**CH**) Bay and the remote-handled (**RH**) Complex. The areas and storage capacities for the WHB unit are defined in Table III.A.1. ~~comprises a total enclosed area of approximately 84,000 ft² (7,804 m²). The WHB Unit shall comprise a surface area of no more than 33,175 ft² (3,082 m²) within the WHB CH Bay, as depicted in Permit Attachment M1, Figure M1-1.~~

The Permittees may store and manage TRU mixed waste in the WHB Unit, provided the Permittees comply with the following conditions:

III.A.1.a. Storage containers - the Permittees shall store TRU mixed waste in containers specified in Permit Condition III.C.1.

III.A.1.b. Storage locations and quantities - the Permittees may store TRU mixed waste containers in ~~four (4)~~ nine (9) locations in the WHB Unit ~~and RH Complex~~, as specified in Table III.A.1 below and depicted in Permit Attachment M1, Figures M1-~~7~~1 and M1-17a, b, and c. The Permittees may store quantities of TRU mixed waste containers in these locations not to exceed the maximum capacities specified in Table III.A.1 below.

Table III.A.1 - WHB Unit			
Description	**Area**	**Maximum Capacity**	**Container Equivalent**
TRUDOCK Storage Area	4,734 ft² (440 m²)	~~530.4~~ 640 ft³ (~~15~~ 18.1 m³)	Contents of 4 ~~Content~~ Contact-Handled Packages
~~NE~~ CH Bay Storage Area	~~2,924~~ 20,574 ft² (~~272~~ 1,911 m²)	~~1856~~ 5,440 ft³ (~~52.6~~ 154.0 m³)	17 loaded facility pallets
~~SE (~~Shielded~~)~~ Storage Area	292.5 ft² (27.2 m²)	~~265~~ 320 ft³ (~~7.5~~ 9.1 m³)	1 loaded facility pallet
Derived Waste Storage Area	48 ft² (4.46 m²)	66.3 ft³ (1.88 m³)	1 Standard Waste Box
Total for CH Waste	**~~20,914.5~~ 25,650 ft² (~~1,945.7~~ 2,383 m²)**	**~~5,826.3~~ 6,466.3 ft³ ~~247.6~~ 183.1 m³**	
RH Bay	12,552 ft² (1166 m²)	~~146.93~~ 147 ft³ (~~4.16~~ 4.2 m³)	2 loaded casks and 1 drum of derived waste
Cask Unloading Room	382 ft² (36 m²)	~~73.45~~ 74 ft³ (~~2.08~~ 2.1 m³)	1 loaded cask
Hot Cell	1,841 ft² (171 m²)	262~~.02~~ ft³ (7.4~~2~~ m³)	10 drums and 6 canisters and 1 drum of derived waste
Transfer Cell	1,003 ft² (93 m²)	31.4~~3~~ ft³ (0.89 m³)	1 canister
Facility Cask Loading Room	1,625 ft² (151 m²)	31.4~~3~~ ft³ (0.89 m³)	1 canister
Total for RH Waste	**17,403 ft² (1,617 m²)**	**~~545.26~~ 545.8 ft³ (~~15.44~~ 15.5 m³)**	
Facility Total	**~~--38,317.5~~ 43,053 ft² (~~3,562.7~~ 4,000 m²)**	**~~2718~~ 7012 ft³ (~~77~~ 199 m³)**	**-**

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

III.A.1.d. Storage of derived waste - the Permittees shall store containers of TRU mixed derived waste only in the Derived Waste Storage Area ~~or in~~, the RH Bay, and the RH Hot Cell. The Permittees shall store the derived waste containers on a pallet that provides secondary containment and elevates the containers at least 6 inches above the floor to protect them from contact with accumulated liquid.

III.A.1.e. ~~Storage~~ CH TRU mixed waste storage time limit - the Permittees shall not store a CH TRU mixed waste container in the WHB Unit for more than sixty (60) calendar days, with the exception of the Derived Waste Storage Area, where derived waste may be accumulated and stored until the container is full.

III.A.1.f. Minimum aisle space - the Permittees shall maintain a minimum aisle space of 44 inches (1.1 m) between facility pallets in the CH Bay of the WHB Unit. The Permittees shall maintain adequate aisle space of 44 inches (1.1 m) between loaded casks in the RH Bay of the WHB Unit. For other locations within the RH Complex, sufficient aisle space will be maintained to assure that emergency equipment can be accessed or moved to the necessary locations.

III.A.1.g. Storage of RH TRU mixed waste containers - the Permittees shall store RH TRU mixed waste in casks, canisters, or drums in the RH Complex as described in Permit Attachment M1, Section M1-1c(1).

III.A.1.h. RH TRU mixed waste storage time limit - the Permittees shall not store a RH TRU mixed waste container in the RH Complex for more than sixty (60) calendar days, with the exception of the Derived Waste Storage Areas, where derived waste may be accumulated and stored until the container is full.

III.A.2. Parking Area Container Storage Unit

The Parking Area Container Storage Unit (**Parking Area Unit**) is an asphalt and concrete surface extending from north of the rail sidings to the WHB, within the Controlled Area. The Parking Area

Unit shall be enclosed by chain link fence. The Parking Area Unit shall comprise a surface area of no more than 115,000 ft^2 (10,700 m^2), as depicted in Permit Attachment M1, Figure M1-2.

The Permittees may store and manage TRU mixed waste in the Parking Area Unit, provided the Permittees comply with the following conditions:

III.A.2.a. Storage containers - the Permittees shall store TRU mixed waste in containers specified in Permit Condition III.C.1. These TRU mixed waste containers shall be stored within the sealed Contact-Handled or Remote-Handled Packages described in Permit Attachment M1.

III.A.2.b. Storage locations and quantities - the Permittees shall store TRU mixed waste containers in any location within the Parking Area Unit, as specified in Table III.A.2 below. The Permittees may store quantities of TRU mixed waste containers within sealed Contact-Handled or Remote-Handled Packages in these locations not to exceed the maximum capacities specified in Table III.A.2 below.

Table III.A.2 - Parking Area Unit

Description	Area	Maximum Capacity	Container Equivalent
Parking Area	115,000 ft^2 (10,700 m^2)	~~1591~~ 7,160 ft^3 (~~45~~ 203 m^3)	~~12~~ 50 Contact-Handled Packages containing waste and 14 Remote-Handled Packages containing waste
Total	**--**	**~~1591~~ 7,160 ft^3 (~~45~~ 203 m^3)**	**-**

III.A.2.c. Prohibition on opening shipping containers - the Permittees shall keep the Contact-Handled or Remote-Handled Packages sealed at all times while in the Parking Area Unit.

III.A.2.d. Storage time limit - the Permittees shall not store sealed Contact-Handled or Remote-Handled Packages in the Parking Area Unit for more than fifty-nine (59) days after the date the Inner Containment Vessel (**ICV**) of the ~~Contact~~

~~Handled~~ Package was sealed at the generator site. Prior to storing a sealed ~~Contact Handled~~ Package, the Permittees shall verify that the ICV Closure Date for each ~~Contact Handled~~ Package is recorded in the WIPP Waste Information System (**WWIS**) database described in Permit Attachment B.

III.A.2.e. Minimum aisle space - the Permittees shall maintain a minimum spacing of 4 ft (1.2 m) between loaded Contact-Handled or Remote-Handled Packages.

III.B. PERMITTED AND PROHIBITED WASTE IDENTIFICATION

III.B.1. Permitted Waste

The Permittees may store and manage TRU mixed waste in the WHB Unit and Parking Area Unit, provided the Permittees comply with the following conditions:

III.B.1.a. Waste analysis plan - the TRU mixed waste shall be characterized to comply with the waste analysis plan specified in Permit Condition II.C.1.

III.B.1.b. TSDF Waste acceptance criteria - the TRU mixed waste shall comply with the treatment, storage, and disposal facility (**TSDF**) waste acceptance criteria specified in Permit Condition II.C.3.

III.B.1.c. Hazardous waste ~~codes~~ numbers - the TRU mixed waste shall contain only hazardous waste ~~codes~~ numbers specified in Permit Condition II.C.4.

III.B.2. Prohibited Waste

The Permittees shall not store or manage any TRU mixed waste that fails to comply with Permit Condition III.B.1.

III.C. CONDITION OF CONTAINERS

If a container holding TRU mixed waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the Permittees shall manage the TRU mixed waste containers specified in Permit Condition III.C.1 as specified in Permit Attachment M1 and in compliance with 20.4.1.500 NMAC (incorporating 40 CFR §264.171).

III.C.1. Acceptable Storage Containers

The Permittees shall use containers that comply with the requirements for U.S. Department of Transportation shipping container regulations (49 CFR §173 - Shippers - General Requirements for Shipment and Packaging, and 49 CFR §178 - Specifications for Packaging) for storage of TRU mixed waste at WIPP. The Permittees are prohibited from storing TRU mixed waste in any container not specified in Permit Attachment M1, Section M1-1b, as set forth below:

III.C.1.a. Standard 55-gallon (208-liter) drum - with a gross internal volume of 7.3 ft^3 (0.21 m^3).

III.C.1.b. Standard waste box (**SWB**) - with a gross internal volume of 66.3 ft^3 (1.88 m^3).

III.C.1.c. Ten-drum overpack (**TDOP**) - with a gross internal volume of 160 ft^3 (4.5 m^3). TDOPs may be used to contain up to ten standard 55-gallon drums or one SWB. TDOPs may be direct loaded or used to overpack drums or SWBs containing CH TRU mixed waste.

III.C.1.d. 85-gallon (322-liter) drum - with a gross internal volume of up to 11.3 ft^3 (0.32 m^3). 85-gallon drums may be direct loaded or used for overpacking 55-gallons drums containing CH TRU mixed waste and for collecting and storing derived waste.

III.C.1.e. 100-gallon (379-liter) drum - with a gross internal volume of 13.4 ft^3 (0.38m^3). 100-gallon drums may be direct loaded with CH TRU mixed waste.

III.C.1.f. RH TRU canister - ~~is a cylindrical container designed to confine and handle the payload of the RH-TRU 72B cask from initial preparation to final disposal (Figure M1-16a)~~ with a ~~nominal~~ gross internal volume of 31.4~~3~~ ft^3 (0.89 m^3). RH TRU canisters ~~that shall~~ contain RH TRU mixed waste packaged in small containers (e.g., 55-gallon drums) or waste loaded directly into the canister.

III.C.1.g. RH TRU facility canister - with a gross internal volume of 31.4 ft^3 (0.89 m^3). RH TRU facility canisters contain up to three 55-gallon drums of RH TRU mixed waste from ~~is a cylindrical container designed to confine and handle~~ the payload of the CNS 10-160B cask

~~once received at WIPP for final disposal (Figure M1-16)~~.

III.C.2. Derived Waste Containers

The Permittees shall use standard 55-gallon drums, SWBs,~~ and~~ or 85-gallon drum~~ overpack~~s to collect,~~ and~~ store, and dispose of derived waste.

III.D. COMPATIBILITY OF WASTE WITH CONTAINERS

The Permittees shall use containers made of or lined with materials which will not react with, and are otherwise compatible with, the TRU mixed waste to be stored, so that the ability of the container to contain the waste is not impaired, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.172).

III.E. MANAGEMENT OF CONTAINERS

The Permittees shall manage all containers as specified in Permit Attachment M1 and shall keep all containers closed during storage, except when it is necessary to add waste to derived waste containers. The Permittees shall not open, handle, or store containers in a manner which may rupture the container or cause it to leak, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.173).

III.F. CONTAINMENT SYSTEMS

The Permittees shall maintain the secondary containment systems for all containers managed in the WHB Unit and Parking Area Unit as specified in Permit Attachment M1, Section M1-1f, and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.175).

III.G. INSPECTION SCHEDULES AND PROCEDURES

The Permittees shall inspect the WHB Unit and Parking Area Unit TRU mixed waste container storage and management areas at least weekly, in accordance with the Inspection Schedule (Permit Attachment D, Tables D-1 and D-1a), Inspection Sheets (Permit Attachment D1), and Permit Attachment M1, Section M1-1e, to detect leaking containers and deterioration of containers and the containment system caused by corrosion and other factors, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.174).

III.G.1. Inspection of 55-Gallon Drum Seven-Packs

The Permittees shall not be required to inspect the center drum of a 55-gallon seven-pack assembly, as depicted in Permit Attachment M2, Figure M2-6.

III.G.2. Inspection of Sealed Contact-Handled or Remote-Handled Packages

The Permittees shall not be required to inspect the contents of sealed Contact-Handled or Remote-Handled Packages stored in compliance with Permit Condition III.A.2 and Permit Attachment M1, Section M1-1e(2). The Permittees shall attach a clearly legible sign to each Contact-Handled and Remote-Handled Package~~s~~ indicating whether the Contact-Handled or Remote-Handled Package~~s~~ contains TRU mixed waste.

III.H. CLOSURE

At closure of the WHB Unit and Parking Area Unit, the Permittees shall remove all hazardous waste and hazardous waste residues from the containment system, in accordance with the procedures in the Closure Plan, Permit Attachment I and Permit Condition II.L, as required by 20.4.1.500 NMAC (incorporating 40 CFR §§264.111 and 264.178).

III.I. RECORDKEEPING

The Permittees shall place the results of waste analyses in the operating record as specified in Permit Condition II.K and Permit Attachment B.

PERMIT ATTACHMENTS

Permit Attachment B (as modified from WIPP RCRA Part B Permit Application, "Waste Analysis Plan" - Chapter C).

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

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

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).

IV. MODULE IV - GEOLOGIC REPOSITORY DISPOSAL

IV.A. DESIGNATED DISPOSAL UNITS

This Module authorizes the management and disposal of contact-handled (**CH**) 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 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.

Table IV.A.1 - Underground HWDUs

Description	Area	Maximum Design Capacity[1,2]	Container Equivalent~~[1]~~
Panel 1	124,150 ft^2 (11,533 m^2)	~~371,000~~ 662,150 ft^3 (~~10,500~~ 18,750 m^3)	~~50,460~~ 89,300 55-Gallon Drums
Panel 2	124,150 ft^2 (11,533 m^2)	~~636,000~~ 662,150 ft^3 (~~18,000~~ 18,750 m^3)	~~86,500~~ 89,300 55-Gallon Drums
Panel 3	124,150 ft^2 (11,533 m^2)	~~636,000~~ 662,150 ft^3 (~~18,000~~ 18,750 m^3)	~~86,500~~ 89,300 55-Gallon Drums
		22,950 ft^3 (650 m^3)	730 RH TRU Canisters
Panel 4	124,150 ft^2 (11,533 m^2)	~~636,000~~ 662,150 ft^3 (~~18,000~~ 18,750 m^3)	~~86,500~~ 89,300 55-Gallon Drums
		22,950 ft^3 (650 m^3)	730 RH TRU Canisters
Panel 5	124,150 ft^2 (11,533 m^2)	~~636,000~~ 662,150 ft^3 (~~18,000~~ 18,750 m^3)	~~86,500~~ 89,300 55-Gallon Drums
		22,950 ft^3 (650 m^3)	730 RH TRU Canisters
Panel 6	124,150 ft^2 (11,533 m^2)	~~636,000~~ 662,150 ft^3 (~~18,000~~ 18,750 m^3)	~~86,500~~ 89,300 55-Gallon Drums
		22,950 ft^3 (650 m^3)	730 RH TRU Canisters
Panel 7	124,150 ft^2 (11,533 m^2)	~~636,000~~ 662,150 ft^3 (~~18,000~~ 18,750 m^3)	~~86,500~~ 89,300 55-Gallon Drums
		22,950 ft^3 (650 m^3)	730 RH TRU Canisters

Total	--	**~~4,187,000~~ 4,635,050 ft³ (~~118,500~~ 131,250 m³)**	**~~569,460~~ 625,000 55-Gallon Drums**
		114,750 ft³ (3,250 m³)	**3650 RH TRU Canisters**

[1] "Maximum Design Capacity"~~ and "Container Equivalent" values have been reduced to actual capacity and container equivalent for closed Underground HWDUs. Total values reflect remaining permitted capacity and container equivalent.~~ is the maximum volume of TRU mixed waste that may be emplaced in each panel, so long as the maximum repository capacity specified in the WIPP Land Withdrawal Act (Pub. L. 102-579, as amended) is not exceeded.
[2] The final volume of TRU mixed waste emplaced in each panel shall be maintained in the operating record.

IV.B. PERMITTED AND PROHIBITED WASTE IDENTIFICATION

IV.B.1. Permitted Waste

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

IV.B.1.a. Waste analysis plan - the TRU mixed waste shall be characterized to comply with the waste analysis plan specified in Permit Condition II.C.1.

IV.B.1.b. TSDF Waste acceptance criteria - the TRU mixed waste shall comply with the treatment, storage, and disposal facility (**TSDF**) waste acceptance criteria specified in Permit Condition II.C.3.

IV.B.1.c. Hazardous waste~~ codes~~ numbers - the TRU mixed waste shall contain only hazardous waste~~ codes~~ numbers specified in Permit Condition II.C.4.

Derived waste may be disposed in the Underground HWDUs as specified in Permit Condition II.C.5.

IV.B.2. Prohibited Waste

IV.B.2.a. General prohibition - the Permittees shall not dispose any TRU mixed waste that fails to comply with Permit Condition IV.B.1.

IV.B.2.b. Specific prohibition - after this Permit becomes effective, the Permittees shall not dispose non-mixed TRU waste in any Underground HWDU unless such waste is characterized in accordance with the requirements of the WAP specified in Permit Condition II.C.1. The Permittees shall not dispose TRU mixed waste in any Underground HWDU if the Underground HWDU contains non-mixed TRU waste which was disposed of after this Permit became effective and was not characterized in accordance with the requirements of the WAP.

IV.C. DISPOSAL CONTAINERS

IV.C.1. Acceptable Disposal Containers

The Permittees shall use containers that comply with the requirements for U.S. Department of Transportation shipping container regulations (49 CFR §173 - Shippers - General Requirements for Shipment and Packaging, and 49 CFR §178 - Specifications for Packaging) for disposal of TRU mixed waste at WIPP. The Permittees are prohibited from disposing TRU mixed waste in any container not specified in Permit Attachment M1, Section M1-1b, as set forth below:

IV.C.1.a. Standard 55-gallon (208-liter) drum - configured as a 7-pack or as an individual unit.

IV.C.1.b. Standard waste box (**SWB**) - as an individual unit.

IV.C.1.c. Ten-drum overpack (**TDOP**) - as an individual unit.

IV.C.1.d. 85-gallon (322-liter) drum - configured as a 4-pack or as an individual unit.

IV.C.1.e. 100 gallon (379-liter) drum - configured as a 3-pack or as an individual unit.

IV.C.1.f. RH TRU canister or RH TRU facility canister - as individual units.

IV.C.2. Condition of Containers

If a container holding TRU mixed waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak prior to disposal in an Underground HWDU, the Permittees shall manage the TRU mixed waste containers specified in Permit Condition IV.C.1 as specified in Permit Attachment M1 and in compliance with 20.4.1.500 NMAC (incorporating 40 CFR §264.171).

IV.D. VOLATILE ORGANIC COMPOUND LIMITS

The Permittees shall limit releases to the air of volatile organic compound waste constituents (**VOCs**) as specified by the following conditions, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601(c)):

IV.D.1. Room-Based Limits

The~~ average~~ measured concentration of VOCs in~~ the headspace gas of all containers and the average calculated emission rate of VOCs from the headspace gas of all containers in~~ any~~ single~~ open (active) room and in each closed room in active panels within an Underground HWDU shall not exceed the limits specified in Table IV.D.1 below:

Table IV.D.1 - VOC Room-Based Limits		
Compound	**VOC Room-Based Concentration Limit (PPMV)**	~~**VOC Room-Based Emission Rate Limit (mole/room/year)**~~
Carbon Tetrachloride	9625	~~4250~~
Chlorobenzene	13000	~~5500~~
Chloroform	9930	~~4860~~
1,1-Dichloroethene	5490	~~2800~~
1,2-Dichloroethane	2400	~~1160~~
Methylene Chloride	100000	~~53650~~
1,1,2,2-Tetrachloroethane	2960	~~1300~~
Toluene	11000	~~4780~~
1,1,1-Trichloroethane	33700	~~14880~~

There are no maximum concentration~~ or emission rate~~ 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 Condition IV.F.2~~ and as described in Permit Attachment N following procedures~~.

~~IV.D.2.a. VOC Confirmatory Monitoring - the Permittees shall conduct confirmatory monitoring of VOCs as specified in Permit Condition IV.F.2.~~

~~IV.D.2.b. WIPP Waste Information System (**WWIS**) Report - the Secretary shall have the capability of generating a report from the WWIS database, or equivalent, for identifying the average concentrations and total emission rates of the VOCs specified in Table~~

~~IV.D.1 on a room and panel basis, based upon the actual waste containers disposed, the VOC headspace gas sampling data for those containers, and the filter diffusion characteristics for those containers.~~

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").

IV.E.2. Repository Construction

IV.E.2.a. Construction requirements - subject to Permit Condition IV.E.1, the Permittees may excavate the following Underground HWDUs, as depicted in Permit Attachment M2, Figure M2-1, "Repository Horizon", and specified in Section M2-2a(3), "Subsurface Structures (Underground Hazardous Waste Disposal Units (HWDUs))":

- Panel 10 (Disposal area access drift)
- Panel 2
- Panel 9 (Disposal area access drift)
- Panel 3
- Panel 4
- Panel 5
- Panel 6
- Panel 7
- Panel 8

Prior to disposal of TRU mixed waste in a newly constructed Underground HWDU, the Permittees shall comply with the certification requirements specified in Permit Condition I.E.11.

IV.E.2.b. Notification requirements - at least thirty (30) calendar days prior to the projected start date of excavation of each Underground HWDU, the Permittees shall provide written notification to the Secretary and to the WIPP facility mailing list stating the projected start date of excavation, along with supporting rationale (e.g., projected waste receipt rate, etc.).

Prior to disposal of TRU mixed waste in a newly constructed Underground HWDU, the Permittees shall comply with the certification requirements specified in Permit Condition I.E.11.

IV.E.3. Repository Operation

IV.E.3.a. Underground traffic flow - the Permittees shall restrict and separate the ventilation and traffic flow areas in the underground TRU mixed waste handling and disposal areas from the ventilation and traffic flow areas for mining and construction equipment as specified in Permit Attachment G (Traffic Patterns), Figure G-4. TRU mixed waste handling and disposal traffic shall use the waste area intake ventilation drift to access the Underground HWDUs. Mining and construction equipment traffic may use either the construction 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.

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 days of its issuance, as specified in Permit Attachment M2, Section M2-5b(2)(a), "Description of the Geomechanical Monitoring System".

IV.F.2. ~~Air~~ Repository Volatile Organic Compound Monitoring

IV.F.2.a. Implementation of ~~Confirmatory~~ repository VOC ~~Monitoring Plan~~ monitoring - the Permittees shall implement ~~the Confirmatory VOC Monitoring Plan~~ repository VOC monitoring as specified in Permit Attachment N (~~Confirmatory~~ 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 ~~this plan~~ 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 submit to the Secretary an annual report, beginning twelve (12) months after issuance of this ~~permit~~ Permit, describing the implementation and presenting the data and analysis of the ~~Confirmatory~~ VOC Monitoring Plan. ~~This report shall~~

~~also present data from the WWIS as specified in Permit Condition IV.D.2.b and correlate this data, using appropriate statistical methods, with data from the Confirmatory VOC Monitoring Plan.~~

IV.F.2.c. Notification requirements - the Permittees shall notify the Secretary in writing, within five (5) working days 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 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.

Table IV.F.2.c - VOC Concentrations of Concern

Compound	**Drift E-300 Concentration**	
	ug/m3	ppbv
Carbon Tetrachloride	1050	165
Chlorobenzene	1015	220
Chloroform	890	180
1,1-Dichloroethene	410	100
1,2-Dichloroethane	175	45
Methylene Chloride	6700	1930
1,1,2,2-Tetrachloroethane	350	50
Toluene	715	190
1,1,1-Trichloroethane	3200	590

IV.F.2.d. Remedial action - if the running annual average concentration for a VOC specified in Table IV.D.1 exceeds the concentration of concern specified in Table IV.F.2.c, the Permittees shall cease disposal in the active disposal room and install ventilation barriers as specified in Permit Condition IV.E.3.c.

If the running annual average concentration for a VOC specified in Table IV.D.1 exceeds the concentration of concern specified in Table IV.F.2.c for six (6) consecutive months, the

Permittees shall close the affected Underground HWDU as specified in Permit Condition IV.I.1.

For any remedial action taken under this Permit Condition, the Permittees shall submit to the Secretary written quarterly status reports, beginning thirty (30) calendar days after the Permittees submit the initial notification in Permit Condition IV.F.2.c which resulted in the remedial action. The quarterly status report shall analyze the cause of exceedance, describe the implementation and results of the remedial action, and describe measures taken to prevent future exceedances. The Permittees shall submit such reports until the Secretary determines the remedial action has been completed in accordance with all applicable requirements of this Permit.

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. ~~Reporting~~ Notification requirements - the Permittees shall notify the Secretary in writing, within five (5) working 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 ~~any~~ 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~~s~~ for VOC Constituents of Concern in Any Closed Room, ppmv**	**95% Action Level~~s~~ 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 ~~a concentration of one half of the limit~~ the "50% Action Level" in Table IV.D.1, 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 ~~one half of the limits~~ the "50% Action Level" in Table IV.D.1, or until closure of Room 1 of the panel, whichever occurs first. If one or more of the VOCs in Table IV.D.1 ~~reaches a concentration of 95 percent~~ in the ~~closed~~ active open room or immediately adjacent closed room ~~to the active 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 ~~is at the 95 percent action level~~ 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 - as part of the annual report to the Secretary required under Permit Condition IV.F.2.b, the Permittees shall describe the implementation and present 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 days.

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
9. Disposal Date

The Permittees shall also maintain, in the operating record, a map or diagram depicting the location and quantity of each waste. The map or diagram shall include a cross reference to specific manifest document numbers, if the waste was accompanied by a manifest, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.73(b)(2)).

IV.H.3. Ventilation Rates

The Permittees shall maintain, in the operating record, a record identifying any non-conformance to the ventilation rates specified in Permit Condition IV.E.3.b.

IV.I. CLOSURE

IV.I.1. Panel Closure

Upon completion of disposal in an Underground HWDU, the Permittees shall provide written notification to the Secretary stating the final volume of TRU mixed waste emplaced in the Underground HWDU. The Permittees shall also close the Underground HWDU as specified in Permit Attachment I (Closure Plan) and Permit Attachment I1 (Technical Specifications, Panel Closure System, Waste Isolation Pilot Plant).

IV.I.2. Repository Closure

Upon completion of disposal in the repository and closure of all Underground HWDUs, the Permittees shall close the repository as specified in Permit Attachment I and Permit Attachment I2 (Shaft Sealing System Compliance Submittal Design Report).

IV.I.3. Repository Post-Closure

Upon completion of repository closure as specified in Permit Condition IV.I.2, the Permittees shall comply with all post-closure requirements as specified in Permit Module VI, Post-Closure Care.

IV.J. COMPLIANCE SCHEDULE

The Permittees shall provide a Mine Ventilation Rate Monitoring Plan to the Secretary within ninety (90) calendar days of issuance of this Permit.

IV.J.1. Objective

The Mine Ventilation Rate Monitoring Plan shall specify a monitoring program that will result in the collection of data of adequate quantity and quality to allow the Permittees to demonstrate compliance with the ventilation requirements of Permit Condition IV.E.3.b.

IV.J.2. Content of the Mine Ventilation Rate Monitoring Plan

The Mine Ventilation Rate Monitoring Plan shall address the following at a minimum: objectives of the monitoring; design of the monitoring program (including monitoring schedule and monitoring equipment); monitoring procedures; equipment calibration and maintenance; data evaluation, reporting and recordkeeping; and quality assurance.

IV.J.3. Incorporation of Permit Requirements

The Permittees shall incorporate the implementation, reporting and notification requirements of Permit Condition IV.F.4 into the appropriate section(s) of the Mine Ventilation Rate Monitoring Plan.

IV.J.4. Approval of the Plan

After the Permittees submit the Mine Ventilation Rate Monitoring Plan, the Secretary may approve, disapprove, or modify and approve the Mine Ventilation Rate Monitoring Plan in writing.

If the Secretary approves the Mine Ventilation Rate Monitoring Plan, the Secretary will modify the permit in accordance with Permit Condition I.B.1.

In the event of disapproval (in whole or in part) of the Mine Ventilation Rate Monitoring Plan, the Secretary shall specify deficiencies in writing. The Permittees shall correct these deficiencies and submit a modified Mine Ventilation Rate Monitoring Plan within thirty (30) calendar days of such written notification to the Secretary for review.

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 Q ("Mine Ventilation Rate Monitoring Plan").

ATTACHMENT A

GENERAL FACILITY DESCRIPTION AND PROCESS INFORMATION

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ATTACHMENT A

GENERAL FACILITY DESCRIPTION AND PROCESS INFORMATION

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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:	~~Dr. Inés R. Triay,~~ Lloyd L. Piper, Acting Manager DOE/Carlsbad Field Office Richard D. Raaz, 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:	32^{o} 22' 30" N 103^{o} 47' 30" W
DATE OPERATIONS BEGAN:	November 26, 1999

A-2 Description of Activities

The Waste Isolation Pilot Plant (**WIPP**) is a facility for the management, storage and disposal of transuranic (**TRU**) mixed waste.~~ Only~~ Both contact-handled (**CH**) and remote-handled (**RH**) TRU mixed wastes are ~~is~~ permitted for storage or disposal at the WIPP facility.~~ No remote-handled (**RH**) TRU mixed waste will be accepted at the facility under this permit.~~

A-3 Property Description

The WIPP facility has been divided into functional areas. The Property Protection Area (**PPA**), surrounded by a chain-link security fence, encompasses 34.16 acres and provides security and protection for all major surface structures. The DOE Off Limits Area encloses the PPA, and is approximately 1,454 acres. These areas define the DOE exclusion zone within which certain items and material are prohibited. The final zone is marked by the WIPP Site Boundary (WIPP land withdrawal area) a 16-section Federal land area under the jurisdiction of the DOE.

A-4 Facility Type

There are three basic groups of structures associated with the WIPP facility: surface structures, shafts and underground structures. The surface structures accommodate the personnel, equipment, and support services required for the receipt, preparation, and transfer of TRU mixed waste from the surface to the underground. There are two surface locations where TRU mixed waste will be managed and stored. The first area is ~~includes a portion of~~ the Waste Handling Building (**WHB**)~~, of which 33,175 square feet is designated as the WHB~~ Container Storage Unit (WHB Unit) for TRU mixed waste management and storage. The WHB Unit consists of the WHB contact-handled (**CH**) Bay and the remote-handled (**RH**) Complex. The second area designated for managing and storing TRU mixed waste is the Parking Area Container Storage Unit (Parking Area Unit), an outside container storage area which extends south from the WHB to the rail siding. The Parking Area Unit provides storage space for up to ~~12~~ 50 loaded Contact-Handled Packages and 14 loaded Remote-Handled Packages on an asphalt and concrete surface ~~encompassing approximately 115,000 square feet~~.

Four vertical shafts connect the surface facility to the underground. These are the Waste Shaft, the Salt Handling Shaft, the Exhaust Shaft and the Air Intake Shaft. The Waste Shaft is the only shaft used to transport TRU mixed waste to the underground. The WIPP underground structures are located in a mined salt bed 2,150 feet below the surface.

The underground structures include the underground Hazardous Waste Disposal Units (**HWDUs**), an area for future underground HWDUs, the shaft pillar area, interconnecting drifts and other areas unrelated to the RCRA Hazardous Waste Permit. The underground HWDUs are defined as waste panels, each consisting of seven rooms and two access drifts. The WIPP underground area is designated as Panels 1 through 10, although only Panels 1 through 7 will be used under the terms of this permit. Each of the seven rooms is approximately 300 feet long, 33 feet wide and 13 feet high.

A-5 Waste Description

Wastes destined for WIPP are byproducts of nuclear weapons production and have been identified in terms of waste streams based on the processes that produced them. Each waste stream identified by generators is assigned to a Waste Summary Category to facilitate RCRA waste characterization, and reflect the final waste forms acceptable for WIPP disposal.

These Waste Summary Categories are:

S3000—Homogeneous Solids
Solid process residues defined as solid materials, excluding soil, that do not meet the applicable regulatory criteria for classification as debris [20.4.1.800 NMAC, (incorporating 40 CFR §268.2(g) and (h))]. Solid process residues include inorganic process residues, inorganic sludges, salt waste, and pyrochemical salt waste. Other waste streams are included in this Waste Summary Category based on the specific waste stream types and final waste form. This category includes wastes that are at least 50 percent by volume solid process residues.

S4000—Soils/Gravel
This waste summary category includes waste streams that are at least 50 percent by volume soil. Soils are further categorized by the amount of debris included in the matrix.

S5000—Debris Wastes
This waste summary category includes waste that is at least 50 percent by volume materials that meet the NMAC criteria for classification as debris (20.4.1.800 NMAC (incorporating 40 CFR §268.2)). Debris means solid material exceeding a 2.36 inch (60 millimeter) particle size that is intended for disposal and that is: 1) a manufactured object, 2) plant or animal matter, or 3) natural geologic material.

The S5000 Waste Summary Category includes metal debris, metal debris containing lead, inorganic nonmetal debris, asbestos debris, combustible debris, graphite debris, heterogeneous debris, and composite filters, as well as other minor waste streams. Particles smaller than 2.36 inches in size may be considered debris if the debris is a manufactured object and if it is not a particle of S3000 or S4000 material.

If a waste does not include at least 50 percent of any given category by volume, characterization shall be performed using the waste characterization process required for the category constituting the greatest volume of waste for that waste stream.

Wastes may be generated at the WIPP facility as a direct result of managing the TRU and TRU mixed wastes received from the off-site generators. Such waste may be generated in either the WHB or the underground. This waste is referred to as "derived waste." All such derived waste will be placed in the rooms in HWDUs along with the TRU mixed waste for disposal.

Non-mixed hazardous wastes generated at the WIPP, through activities where contact with TRU mixed waste does not occur, are characterized, placed in containers, and stored (for periods not exceeding the limits specified in 20.4.1.300 NMAC (incorporating 40 CFR §262.34)) until they are transported off site for treatment and/or disposal at a permitted facility. This waste generation and accumulation activity, when performed in compliance with 20.4.1.300 NMAC (incorporating 40 CFR §262), is not subject to RCRA permitting requirements and, as such, is not addressed in the permit.

A-6 Chronology of Events Relevant to Changes in Ownership or Operational Control

December 19, 1997	NMED received notification of a change of name/ownership from Westinghouse Electric Corporation to CBS Corporation. The WIPP Management and Operating Contractor (**MOC**), Westinghouse Waste Isolation Division (**WID**), became a division of Westinghouse Electric Company, which in turn was a division of CBS Corporation. Notification to NMED was made by the permit applicant in a letter dated December 18, 1997. The permit application was under review, but a draft permit was not yet issued.
September 22, 1998	NMED received notification of a pending transfer of ownership for the MOC, Westinghouse WID, from CBS Corporation to an as-yet-to-be-named limited liability company owned jointly by British Nuclear Fuels, plc and Morrison-Knudsen Corporation. The transfer of ownership was scheduled to occur on or about December 15, 1998. Notification to NMED was made by the permit applicant in a letter dated September 17, 1998. The draft permit had been issued for public comment, but the final permit was not yet issued.
March 9, 1999	NMED again received notification of the pending divestiture of the MOC, Westinghouse WID, by CBS Corporation to the limited liability company owned jointly by British Nuclear Fuels, plc and Morrison-Knudsen Corporation known as MK/BNFL GESCO LLC. The new MOC would be renamed to Westinghouse Government Environmental Services Company LLC. Notification to NMED was made by the permit applicant in a letter dated March 2, 1999. The public hearing on the permit was underway, but the final permit was not yet issued.
March 26, 1999	NMED received official notification of the divestiture of Westinghouse Electric Company by CBS Corporation to MK/BNFL GESCO LLC effective March 22, 1999. The MOC was renamed Westinghouse Government Environmental Services Company LLC (**WGES**), of which Westinghouse Waste Isolation Division was a division. This transaction constituted a change of operational control under 20.4.1.900 NMAC (incorporating 40 CFR §270.40). Notification to NMED was made by the permit applicant in a letter dated March 24, 1999. The public hearing on the permit was nearly concluded, but the final permit was not yet issued.
April 28, 1999	NMED received a revised Part A Permit Application in a letter dated April 21, 1999, reflecting that the Westinghouse Waste Isolation Division, co-operator of the WIPP hazardous waste facility, was now a part of WGES. However, the final permit, issued October 27, 1999, did not reflect the change in ownership.

July 25, 2000	NMED received a Class 1 permit modification in a letter dated July 21, 2000, changing the name in the Permit from Westinghouse Electric Corporation to Westinghouse Government Environmental Services 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., and BNFL Nuclear Services, Inc.. However, Washington Group International has acquired BNFL's prior interest in the former Westinghouse government services businesses, which includes BNFL's prior interest in WGES.

ATTACHMENT B

WASTE ANALYSIS PLAN

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ATTACHMENT B

WASTE ANALYSIS PLAN

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ATTACHMENT B

WASTE ANALYSIS PLAN

B-0 Introduction and Attachment Highlights

This waste analysis plan (**WAP**) has been prepared for management, storage, or disposal activities to be conducted at the Waste Isolation Pilot Plant (**WIPP**) facility to meet requirements set forth in 20.4.1.500 NMAC (incorporating 40 CFR §264.13). Guidance in the most recent U.S. Environmental Protection Agency (**EPA**) manual on waste analysis has been incorporated into the preparation of this WAP (EPA, 1994). This WAP includes test methods, details of planned waste sampling and analysis for complying with the general waste analysis requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.13), a description of the waste shipment screening and verification process, and a description of the quality assurance (**QA**)/quality control (**QC**) program. Before the Permittees manage, store, or dispose transuranic (**TRU**) mixed waste from a generator/storage site (**site**), the Permittees shall require that site to implement the applicable requirements of this WAP.

TRU mixed waste that may be stored or disposed at WIPP are or were generated at DOE generator/storage sites by various specific processes and activities. Examples of the major types of operations that generate this waste include:

- Production of Nuclear Products—Production of nuclear products includes reactor operation, radionuclide separation/finishing, and weapons fabrication and manufacturing. The majority of the TRU mixed waste was generated by weapons fabrication and radionuclide separation/finishing processes. More specifically, wastes consist of residues from chemical processes, air and liquid filtration, casting, machining, cleaning, product quality sampling, analytical activities, and maintenance and refurbishment of equipment and facilities.

- Plutonium Recovery—Plutonium recovery wastes are residues from the recovery of plutonium-contaminated molds, metals, glass, plastics, rags, salts used in electrorefining, precipitates, firebrick, soot, and filters.

- Research and Development (**R&D**)—R&D projects include a variety of hot cell or glovebox activities that often simulate full-scale operations described above, producing similar TRU mixed wastes. Other types of R&D projects include metallurgical research, actinide separations, process demonstrations, and chemical and physical properties determinations.

- Decontamination and Decommissioning—Facilities and equipment that are no longer needed or usable are decontaminated and decommissioned, resulting in TRU mixed wastes consisting of scrap materials, cleaning agents, tools, piping, filters, Plexiglas™, gloveboxes, concrete rubble, asphalt, cinder blocks, and other building materials. These materials are expected to be the largest category by volume of TRU mixed waste to be generated in the future.

TRU mixed waste contains both TRU radioactive and hazardous components, as defined in 20.4.1.800 NMAC (incorporating 40 CFR, §268.35(d)), and in the Federal Facility Compliance Act, Public Law 102- 386, Title 1, §3021(d). It is designated and separately packaged as either contact-handled (**CH**) or remote-handled (**RH**), based on the radiological dose rate at the surface of the waste container. ~~RH TRU mixed wastes will not be received and disposed at the WIPP facility.~~

The hazardous components of the TRU mixed waste to be managed at the WIPP facility are designated in Table B-~~10~~9. Some of the waste may also be identified by unique state hazardous waste codes or numbers. These wastes are acceptable at WIPP as long as the Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (**TSDF-WAC**) in Module II are met. This WAP describes the measures that will be taken to ~~assure~~ ensure that the TRU mixed wastes received at the WIPP facility are within the scope of Table B-~~10~~9 as established by 20.4.1.500 NMAC (incorporating 40 CFR §264), and that they comply with unit-specific requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.600), Miscellaneous Units.

Some TRU mixed waste is retrievably stored at the DOE generator/storage sites. Additional TRU mixed waste will be generated and packaged into containers at these generator/storage sites in the future. TRU mixed waste will be retrieved from storage areas at a DOE generator/storage site. Retrievably stored waste is defined as TRU mixed waste generated after 1970 and before the New Mexico Environment Department (**NMED**) notifies the Permittees, by approval of the final audit report, that the characterization requirements of the WAP at a generator/storage site have been implemented. Newly generated waste is defined as TRU mixed waste generated after NMED approves the final audit report for a generator/storage site. Acceptable knowledge (**AK**) information is assembled for both retrievably stored and newly generated waste. ~~Retrievably~~ Waste characterization of retrievably stored TRU mixed waste will be ~~characterized~~ performed on an ongoing basis, as the waste is retrieved. ~~Newly~~ Waste characterization of newly generated TRU mixed waste is typically ~~characterized~~ performed as it is generated, although some characterization occurs post-generation. Waste characterization requirements for retrievably stored and newly generated TRU mixed wastes differ, as discussed in Sections B-3d(1) and B-3d(2).

Waste characterization is defined in Module I as the activities performed by the waste generator to satisfy the general waste analysis requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.13(a)) before waste containers have been certified for disposal at WIPP. The characterization process for WIPP waste is presented in Figure B-2. Generator site waste characterization programs are first audited by the Permittees, with NMED approving the final audit report. After this, generator sites determine whether AK alone is sufficient for characterization, or whether a sampling and analysis program in conjunction with AK is necessary to adequately characterize wastes. If an AK Sufficiency Determination is sought, information is provided to the Permittees for their review and provisional approval; NMED determination of adequacy of the AK information is required before final approval by the Permittees. If the sampling and analysis route is chosen, sites proceed to sample and analyze waste in conjunction with AK and in accordance with this WAP. Once an AK Sufficiency Determination is obtained, or when required sampling and analysis data are obtained, sites would then prepare and submit the Waste Stream Profile Report for the Permittees' approval. Once the WSPF is approved, a site may ship waste to WIPP. The Permittees will perform waste confirmation as specified in Permit Attachment B7, through non destructive examination (**NDE**) of a representative subpopulation of certified waste containers, to ensure that the wastes meet the TSDF-WAC.

B-0a Waste Characterization

Characterization requirements for individual containers of TRU mixed waste are specified on a waste stream basis. A waste stream is defined as waste material generated from a single process or from an activity that is similar in material, physical form, and hazardous constituents. Waste streams are grouped by Waste Matrix Code Groups related to the physical and chemical properties of the waste. Generator/storage sites shall use the characterization techniques described in this WAP to assign appropriate Waste Matrix Code Groups for WIPP disposal. The Waste Matrix Code Groups are solidified inorganics, solidified organics, salt waste, soils, lead/cadmium metal, inorganic nonmetal waste, combustible waste, graphite, filters, heterogeneous debris waste, and uncategorized metal. Waste Matrix Code Groups can be grouped into three Summary Category groups: Homogeneous Solids (Summary Category S3000), Soil/Gravel (Summary Category S4000), and Debris Waste (Summary Category S5000).

TRU mixed wastes are initially categorized into the three broad Summary Category Groups that are related to the final physical form of the wastes. Waste characterization requirements for these groups are specified separately in Section B-2 of this WAP. Each of the three groups is described below.

S3000 - Homogeneous Solids

Homogeneous solids~~, or solid process residues,~~ are defined as solid materials, excluding soil, that do not meet the NMED criteria for classification as debris (20.4.1.800 NMAC (incorporating 40 CFR §268.2[g] and [h])). Included in the series of ~~solid process residues~~ homogeneous solids are inorganic process residues, inorganic sludges, salt waste, and pyrochemical salt waste. Other waste streams are included in this Summary Category Group based on the specific waste stream types and final waste form. This Summary Category Group is expected to contain toxic metals and spent solvents. This category includes wastes that are at least 50 percent by volume ~~solid process residues~~ homogeneous solids.

S4000 - Soils/Gravel

This Summary Category Group includes S4000 waste streams that are at least 50 percent by volume soil/gravel. This Summary Category Group is expected to contain toxic metals. ~~Soils/gravel are further categorized by the amount of debris included in the matrix.~~

S5000 - Debris Wastes

This Summary Category Group includes heterogeneous waste that is at least 50 percent by volume materials that meet the criteria specified in 20.4.1.800 NMAC (incorporating 40 CFR §268.2 (g)). Debris means solid material exceeding a 2.36 inch (in.) (60 millimeter) particle size that is intended for disposal and that is:

1. a manufactured object, or
2. plant or animal matter, or

3. natural geologic material.

Particles smaller than 2.36 inches in size may be considered debris if the debris is a manufactured object and if it is not a particle of S3000 or S4000 material.

If a waste does not include at least 50 percent of any given ~~category~~ Summary Category Group by volume, characterization shall be performed using the waste characterization process required for the category constituting the greatest volume of waste for that waste stream (see Section B-3d).

The most common hazardous constituents in the TRU mixed waste to be managed in the WIPP facility consist of the following:

Metals

Some of the TRU mixed waste to be emplaced in the WIPP facility contains metals for which 20.4.1.200 NMAC (incorporating 40 CFR §261.24), toxicity characteristics were established (EPA hazardous waste ~~codes~~ numbers D004 through D011). Cadmium, chromium, lead, mercury, selenium, and silver are present in discarded tools and equipment, solidified sludges, cemented laboratory liquids, and waste from decontamination and decommissioning activities. A large percentage of the waste consists of lead-lined gloveboxes, leaded rubber gloves and aprons, lead bricks and piping, lead tape, and other lead items. Lead, because of its radiation-shielding applications, is the most prevalent toxicity-characteristic metal present.

Halogenated Volatile Organic Compounds

Some of the TRU mixed waste to be emplaced in the WIPP facility contains spent halogenated volatile organic compound (**VOC**) solvents identified in 20.4.1.200 NMAC (incorporating 40 CFR, §261.31) (EPA hazardous waste numbers F001 through F005). Tetrachloroethylene; trichloroethylene; methylene chloride; carbon tetrachloride; 1,1,1-trichloroethane; and 1,1,2-trichloro-1,2,2-trifluoroethane (EPA hazardous waste ~~codes~~ numbers F001 and F002) are the most prevalent halogenated organic compounds identified in TRU mixed waste that may be managed at the WIPP facility during the Disposal Phase. These compounds are commonly used to clean metal surfaces prior to plating, polishing, or fabrication; to dissolve other compounds; or as coolants. Because they are highly volatile, only small amounts typically remain on equipment after cleaning or, in the case of treated wastewaters, in the sludges after clarification and flocculation. Radiolysis may also generate halogenated volatile organic compounds.

Nonhalogenated Volatile Organic Compounds

Xylene, methanol, and n-butanol are the most prevalent nonhalogenated VOCs in TRU mixed waste that may be managed at the WIPP facility during the Disposal Phase. Like the halogenated VOCs, they are used as degreasers and solvents and are similarly volatile. The same analytical methods that are used for halogenated VOCs are used to detect the presence of nonhalogenated VOCs. Radiolysis may also generate non-halogenated volatile organic compounds.

The generator/storage sites shall characterize their waste in accordance with this WAP and associated Permit Attachments, and ensure that waste proposed for storage and disposal at WIPP meets the TSDF-WAC in Module II. The generator/storage site shall assemble the Acceptable Knowledge (**AK**) information into an auditable record[1] for the waste stream as described in Permit Attachment B4. For those waste streams with an approved AK Sufficiency Determination (see below), sampling and analysis per the methods described in Permit Attachments B1 and B2 are not required.

All waste characterization activities specified in this WAP and associated Permit Attachments shall be carried out at generator/storage sites and Permittee approved laboratories in accordance with this WAP. The Permittees will audit generator/storage site waste characterization programs and activities as described in Section B-3. Waste characterization activities at the generator/storage sites include the following, although not all these techniques will be used on each container, as discussed in Section B-3:

- Radiography, which is an x-ray technique to determine physical contents of containers
- Visual examination of opened containers as an alternative way to determine their physical contents
- Headspace-gas sampling to determine VOC content of gases in the void volume of the containers
- Sampling and analysis of waste forms that are homogeneous and can be representatively sampled to determine concentrations of hazardous waste constituents and toxicity characteristic contaminants of waste in containers
- Compilation of AK documentation into an auditable record

B-0b AK Sufficiency Determination

Generator/storage sites may identify waste streams that can be adequately characterized using AK alone, without the need to perform post packaging chemical or physical sampling and analysis on any containers in the waste stream. For those waste streams, the generator/storage sites may submit a request to the Permittees for an AK Sufficiency Determination (**Determination Request**). The contents of the Determination Request are specified in Permit Attachment B4, Section B4-3d.

The Permittees shall evaluate the Determination Request for completeness and technical adequacy. This evaluation shall include, but not be limited to whether the Determination Request is technically sufficient for the following:

- The Determination Request must include all information specified in Permit Attachment B4, Section B4-3d

[1] "Auditable records" mean those records which allow the Permittees to conduct a systematic assessment, analysis, and evaluation of the Permittees' compliance with the WAP and this Permit.

- The AK Summary must identify relevant hazardous constituents, and must correctly identify all toxicity characteristic and listed hazardous waste numbers.
- All hazardous waste number assignments must be substantiated by supporting data and, if not, whether this lack of substantiation compromises the interpretation.
- Resolution of data discrepancies between different AK sources must be technically correct and documented.
- The AK Summary must include all the identification of waste material parameter weights by percentage of the material in the waste stream, and determinations must be technically correct.
- All prohibited items specified in the TSDF-WAC should be addressed, and conclusions drawn must be technically adequate and substantiated by supporting information.
- If the AK record includes process control information specified in Permit Attachment B4, Section B4-3b, the information should include procedures, waste manifests, or other documentation demonstrating that the controls were adequate and sufficient.
- The site must provide the supporting information necessary to substantiate technical conclusions within the Determination Request, and this information must be correctly interpreted.

The Permittees will review the Determination Request for technical adequacy and compliance with the requirements of the Permit, using trained and qualified individuals in accordance with standard operating procedures that shall, at a minimum address all of the technical and procedural requirements listed above. The Permittees shall resolve comments with the generator/storage site and if the Permittees determine that the AK is sufficient, they will provisionally approve the Determination Request and forward it along with all information submitted with the Determination Request to NMED for an evaluation that the provisional approval made by the Permittees is adequate. Based on the results of NMED's evaluation, the Permittees will notify the generator/storage sites whether the AK information is sufficient and the Determination Request is approved. The Permittees will not approve an Determination Request that NMED has determined to be inadequate unless the generator/storage site resolves the inadequacies and provides the resolution to NMED for evaluation of adequacy. At any time, NMED may decide that certain waste stream groupings no longer require NMED evaluation of adequacy of the Permittees' provisional approval of Determination Requests. If this arises, the Secretary will notify the Permittees in writing of this decision, and the Sufficiency Determinations for the specified waste stream groups would no longer require NMED evaluation of adequacy.

In the event the Permittees disagree, in whole or in part, with an evaluation performed by NMED resulting in a determination by NMED that the Permittees' provisional approval for a particular waste stream is inadequate, the Permittees may seek dispute resolution. The dispute resolution process is specified in Module I.

If NMED determines that the Permittees' provisional approval is inadequate, ~~or if~~ the Permittees do not approve a Determination Request, or the generator/storage site does not submit a Determination Request, then sampling and analysis per the methods specified in Permit Attachments B1 and B2 is required to resolve the assignment of EPA hazardous waste numbers. The generator/storage site shall perform sampling and analysis on a representative sample of the waste stream using headspace gas sampling and analysis (for debris waste) or solids sampling and analysis (for homogeneous solid or soil/gravel waste streams).

B-0c Waste Stream Profile Form Completion

After a complete AK record has been compiled and either a Determination Request has been approved by the Permittees or the generator/storage site has completed the applicable representative sampling and analysis requirements specified in Permit Attachments B1 and B2, the generator/storage site will complete a Waste Stream Profile Form (**WSPF**) and Characterization Information Summary (**CIS**). The requirements for the completion of a WSPF and a CIS are specified in Permit Attachment B3, Sections B3-12b(1) and B3-12b(2) respectively.

~~All waste characterization activities specified in this WAP and associated Permit Attachments shall be carried out at generator/storage sites and, as applicable, at the WIPP facility in accordance with this WAP. The Permittees will audit generator/storage site waste characterization programs and activities as described in Section B-3. Waste characterization activities at the generator/storage sites include the following, although not all these techniques will be used on each container, as discussed in Section B-3:~~

- ~~Radiography, which is an x-ray technique to determine physical contents of containers~~

- ~~Visual examination of opened containers as an alternative way to determine their physical contents or to verify Radiography results~~

- ~~Headspace-gas sampling to determine VOC content of gases in the void volume of the containers~~

- ~~Sampling and analysis of waste forms that are homogeneous and can be representatively sampled to determine concentrations of hazardous waste constituents and toxicity characteristic contaminants of waste in containers~~

- ~~Compilation of acceptable knowledge documentation into an auditable record[2]~~

~~Once the required waste characterization is complete, the generator/storage site will complete a Waste Stream Profile Form (WSPF) to document the results of their characterization activities (Section B-1d).~~ The WSPF and the ~~Characterization Information Summary~~ CIS for the waste stream resulting from waste characterization activities shall be transmitted to the Permittees, reviewed for completeness, and screened for acceptance prior to loading any TRU mixed waste into the Contact-Handled or Remote-Handled Packaging at the generator facility, as described in Section B-4. The review and approval process will ensure that the submitted waste analysis information is sufficient to meet the Data Quality Objectives (**DQOs**) for AK in Section B-4a(1) and allow the Permittees to demonstrate compliance with the requirements of this WAP. Only TRU mixed waste and TRU waste that has been characterized in accordance with this WAP

~~[2] "Auditable records" mean those records which allow the Permittees to conduct a systematic assessment, analysis, and evaluation of the Permittees compliance with the WAP and this Permit.~~

and that meets the **TSDF-WAC** specified in this Permit will be accepted at the WIPP facility for disposal in a permitted Underground Hazardous Waste Disposal Unit (**HWDU**). The Permittees will provide NMED with copies of the approved WSPF and accompanying CIS prior to waste stream shipment. Upon notification of approval of the WSPF by the Permittees, the generator/storage site may be authorized to ship waste to WIPP.

In the event the Permittees request detailed information on a waste stream, the site will provide a Waste Stream Characterization Package (Section B3-12b(2)). For each waste stream, this package will include the WSPF, the ~~Characterization Information Summary~~ CIS, and the complete AK summary. The Waste Stream Characterization Package will also include specific Batch Data Reports (**BDRs**) and raw analytical data associated with waste container characterization as requested by the Permittees.

B-0d Waste Confirmation

The Permittees will perform waste confirmation on a representative subpopulation of each waste stream shipment after certification and prior to shipment as described in Permit Attachment B7. The Permittees will use radiography, visual examination (**VE**), or review of VE records (e.g., VE data sheets or packaging logs) to examine 7 percent of each waste stream shipment to confirm that the waste does not contain ignitable, corrosive, or reactive waste. Waste confirmation will be performed by the Permittees at the generator/storage site.

B-1 Identification of TRU Mixed Waste to be Managed at the WIPP Facility

B-1a Waste Stream Identification

TRU mixed waste destined for disposal at WIPP will be characterized on a waste stream basis. Generator/storage sites will delineate waste streams using acceptable knowledge. Required acceptable knowledge is specified in Section B-3b and Permit Attachment B4. ~~If acceptable knowledge for retrievably stored waste does not comply with these requirements (e.g., heterogeneous Debris Waste in Summary Category S5000), the Permittees will reexamine (and characterize) the waste in the same manner as newly generated waste.~~

All of the waste within a waste stream may not be available for sampling and analysis at one time. ~~In these instances, generator/storage sites may divide waste streams into waste stream lots based on staging, transportation, or handling issues. Characterization activities shall then be undertaken on a waste stream lot basis. A WSPF need not be submitted for subsequent waste stream lots unless warranted by the characterization information.~~ Permit Attachment B2 addresses the requirements for selecting waste containers used for characterization of waste streams as they are generated or retrieved.

B-1b Waste Summary Category Groups and Hazardous Waste Accepted at the WIPP Facility

Once a waste stream has been delineated, generator/storage sites will assign a Waste Matrix Code to the waste stream based on the physical form of the waste. Waste streams are then assigned to one of three broad Summary Category Groups; S3000-Homogeneous Solids, S4000-Soils/Gravel, and S5000-Debris Wastes. These Summary Category Groups are used to determine further characterization requirements.

The Permittees will only allow generators to ship those TRU mixed waste streams with EPA hazardous waste ~~codes~~ numbers listed in Table B-~~10~~9. Some of the waste may also be identified by unique state hazardous waste codes or numbers. These wastes are acceptable at WIPP as long as the TSDF-WAC are met. The Permittees will perform characterization of all waste streams as required by this WAP. If during the characterization process, new EPA hazardous waste ~~codes~~ numbers are identified, those wastes will be prohibited for disposal at the WIPP facility until a permit modification has been submitted to and approved by ~~the~~ NMED for these new EPA hazardous waste ~~codes~~ numbers. Similar waste streams at other generator/storage sites will be examined by the Permittees to ensure that the newly identified EPA hazardous waste ~~codes~~ numbers do not apply to those similar waste streams. If the other waste streams also require new EPA hazardous waste ~~code~~ numbers, shipment of these similar waste streams will also be prohibited for disposal until a permit modification has been submitted to and approved by NMED.

B-1c <u>Waste Prohibited at the WIPP Facility</u>

The following TRU mixed waste are prohibited at the WIPP facility:

C liquid waste (waste shall contain as little residual liquid as is reasonably achievable by pouring, pumping and/or aspirating, and internal containers shall contain less than 1 inch or 2.5 centimeters of liquid in the bottom of the container. Total residual liquid in any payload container (e.g., 55 gallon drum or standard waste box) may not exceed 1 percent volume of that container. Payload containers with U134 waste shall have no detectable liquid)

C non-radionuclide pyrophoric materials, such as elemental potassium

C hazardous wastes not occurring as co-contaminants with TRU mixed wastes (non-mixed hazardous wastes)

C wastes incompatible with backfill, seal and panel closures materials, container and packaging materials, shipping container materials, or other wastes

C wastes containing explosives or compressed gases

C wastes with polychlorinated biphenyls (**PCBs**) not authorized under an EPA PCB waste disposal authorization

C wastes exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA Hazardous Waste Numbers of D001, D002, or D003)

~~C RH TRU mixed waste (waste with a surface dose rate of 200 millirem per hour or greater)~~

C waste that has ever been managed as high-level waste and waste from tanks specified in Table B-~~9~~8, unless specifically approved through a Class 3 permit modification

- ~~any waste container that does not have VOC concentration values reported for the headspace~~

- any waste container from a waste stream (or waste stream lot) which has not undergone either radiographic or visual examination of a statistically representative subpopulation of the waste stream in each shipment, as described in Permit Attachment B7

- any waste container from a waste stream which has not been preceded by an appropriate, certified WSPF (see Section B-1d)

Before accepting a container holding TRU mixed waste, the Permittees will~~ ensure, through audit and as part of their Permittee-level data reviews (Section B3-10c), that generator/storage sites examine the radiography or visual examination data records (Section B-4b) to verify that the container holds no unvented compressed gas containers and that residual liquid does not exceed 1 percent volume in any payload container. If discrepancies or inconsistencies are detected during the data review, the generator/storage site will review the radiography video tape or visual examination tape to verify that the observed physical form of the waste is consistent with the waste stream description provided by the generator and to ensure that no prohibited items are present in the waste. Radiography tapes will be selected randomly from at least one percent of containers received at WIPP and will be reviewed and compared to radiographic data forms. (Note that for radiography tapes containing classified information, review of radiography tapes will be conducted by the Permittees at a secure location other than WIPP. The records generated from the Permittee's review of radiography tapes will be sent to WIPP for inclusion in the Operating Record, while the original tape will be maintained at another secure location.) All personnel who review radiography video tapes will be trained to the same standard as radiography operators.~~ perform waste confirmation activities on each waste stream shipment to confirm that the waste does not contain ignitable, corrosive, or reactive waste and the assigned EPA hazardous waste numbers are allowed for storage and disposal by this Permit. Waste confirmation activities will be performed on 7 percent of each waste stream shipped, equating to examination of at least one of fourteen containers in each waste stream shipment. If fewer than fourteen containers in a waste stream shipment are received, one container will be examined to satisfy waste confirmation requirements. Section B-4 and Permit Attachment B7 include~~s a~~ descriptions of the waste~~ verification~~ confirmation processes that the Permittees will conduct prior to receiving a shipment at the WIPP facility.

Containers are vented through filters, allowing any gases that are generated by radiolytic and microbial processes within a waste container to escape, thereby preventing over pressurization or development of conditions within the container that would lead to the development of ignitable, corrosive, reactive, or other characteristic wastes.

To ensure the integrity of the WIPP facility, waste streams identified to contain incompatible materials or materials incompatible with waste containers cannot be shipped to WIPP unless they are treated to remove the incompatibility. Only those waste streams that are compatible or have been treated to remove incompatibilities will be shipped to WIPP.

~~The VOC concentrations in the headspace of waste containers have been limited to those which when averaged on a room basis, will ensure compliance with the performance standards.~~

~~These limits are presented in Table B-2 as maximum allowable VOC room-averaged headspace concentration limits. There are no maximum allowable headspace gas concentration limits for individual containers, as some containers can exceed these values as long as container headspace averages in a disposal room do not.~~

B-1d Control of Waste Acceptance

Every waste stream shipped to WIPP shall be preceded by a WSPF (Figure B-1) and a CIS. The required WSPF information and the ~~Characterization Information Summary~~ CIS elements are found in Section B3-12b(1) and Section B3-12b(2).

Generator/storage sites will provide the WSPF to the Permittees for each waste stream prior to its acceptance for disposal at WIPP. The WSPF and the ~~Characterization Information Summary~~ CIS will be transmitted to the Permittees for each waste stream from a generator/storage site. If continued waste characterization reveals discrepancies that identify different hazardous waste ~~codes~~ numbers or indicates that the waste belongs to a different waste stream, the waste will be redefined to a separate waste stream and a new WSPF submitted.

The Permittees are responsible for the review of WSPFs ~~(Section B3-12b(1))~~ and ~~Characterization Information Summaries~~ CISs to verify compliance with the restrictions on TRU mixed wastes for WIPP disposal. The Permittees will submit completed WSPFs to NMED prior to waste stream shipment. The Permittees will also be responsible for the review of shipping records (Section B-~~4b~~5) to ~~verify~~ confirm that each waste container has been prepared and characterized in accordance with applicable provisions of this WAP. Waste characterization data shall ~~confirm~~ ensure the absence of prohibited items specified in Section B-1c.

As stated in the Introduction of this WAP, any time the Permittees request additional information concerning a waste stream, the generator/storage site will provide a Waste Stream Characterization Package (Section B3-12b(2)). The option for the Permittees to request additional information ensures that the waste being offered for disposal is adequately characterized and accurately described on the WSPF.

B-1e Waste Generating Processes at the WIPP Facility

Waste generated as a result of the waste containers handling and processing activities at the WIPP facility is termed "derived" waste. Because derived wastes can contain only those RCRA-regulated materials present in the waste from which they were derived, no additional characterization of the derived waste is required for disposal purposes. In other words, the generator/storage site's characterization data and knowledge of the processes at the WIPP facility will be used to identify and characterize hazardous waste and hazardous constituents in derived waste. The management of derived waste is addressed in Permit Attachment M1.

B-2 Waste Characterization Program Requirements and Waste Characterization Parameters

The Permittees shall require the sites to develop the procedure(s) which specify their programmatic waste characterization requirements. The Permittees will evaluate the procedures during audits conducted under the Permittees' Audit and Surveillance Program (Section B-5a(3)) and may also evaluate the procedures as part of the review and approval of the WSPF.

Sites must notify the Permittees and obtain approval prior to making data-affecting modifications to procedures. Program procedures shall address the following minimum elements:

- Waste characterization and certification procedures for retrievably stored and newly generated wastes to be sent to the WIPP facility

- ~~Procedures describing management controls~~ Methods used to ensure prohibited items are documented and managed. These will include procedures for performing radiography, VE, or treatment, if these methods are used to ensure prohibited items are not present in the waste prior to shipment of the waste to WIPP.

- ~~Procedures that assure unacceptable wastes (e.g., reactive, ignitable, corrosive) are identified and segregated from TRU mixed waste populations sent to WIPP. These will include procedures for performing radiography, VE, or treatment, if these methods are used to assure unacceptable wastes are not present prior to shipment of the waste to WIPP.~~

- Procedures used to verify packaging configurations to determine the correct drum age criteria (**DAC**) if headspace gas sampling and analysis is used to collect waste characterization information per Section B1-1a(1) of the WAP.

- Identify the organization(s) responsible for compliance with ~~administrative controls and~~ waste characterization and certification procedures.

- Identify the oversight procedures and frequency of actions to verify compliance with ~~administrative controls and~~ waste characterization and certification procedures.

- Develop training specific to ~~administrative control and~~ waste characterization and certification procedures.

- Ensure that personnel may stop work if noncompliance with ~~administrative controls or~~ waste characterization or certification procedures is identified.

- Develop a nonconformance process that complies with the requirements in Permit Attachment B3 of the WAP to document and establish corrective actions.

- As part of the corrective action process, assess the potential time frame of the noncompliance, the potentially affected waste population(s), and the reassessment and recertification of those wastes.

- A listing of all approved hazardous waste numbers which are acceptable at WIPP are included in the Table B-8.

For those waste streams or containers that are not amenable to radiography (e.g., RH TRU mixed waste, direct loaded ten-drum overpacks (**TDOPs**)) for waste confirmation by the Permittees as described in Permit Attachment B7, generator/storage site VE data may be used for waste acceptance. In those cases, the Permittees will review the generator/storage site VE procedures to ensure that data sufficient for the Permittees' waste acceptance activities as described in Permit Attachment B7 will be obtained and the procedures meet the minimum requirements for visual examination specified in Permit Attachment B1, Section B1-3.

The following waste ~~analysis~~ characterization parameters shall be ~~characterized at~~ obtained from the generator/storage sites:

- ~~Confirmation of physical form and exclusion of prohibited items specified in Section B-1c~~
- ~~Toxicity characteristic contaminants listed in 20.4.1.200 NMAC (incorporating 40 CFR, §261.24), Table 1 (excluding pesticides), as specified in .~~
- ~~F-listed, P-listed, and U-listed solvents or wastes in Table B-109 found in 20.4.1.200 NMAC (incorporating 40 CFR §261.31)~~
- ~~Hazardous constituents included in 20.4.1.200 NMAC (incorporating 40 CFR §261) Appendix VIII as specified in Tables B-1, B-3 and B-4, as well as any other hazardous constituent identified through acceptable knowledge.~~
- Determination whether TRU mixed waste streams comply with the applicable provisions of the TSDF-WAC
- Determination whether TRU mixed wastes exhibit a hazardous characteristic (20.4.1.200 NMAC, incorporating 40 CFR §261 Subpart C)
- Determination whether TRU mixed wastes are listed (20.4.1.200 NMAC, incorporating 40 CFR §261 Subpart D)
- Estimation of waste material parameter weights

Tables B-1, B-~~3~~2, B-~~4~~3 and B-~~5~~4 provide the parameters of interest for the various constituent groupings and analytical methodologies. The following sections provide a description of the acceptable methods to evaluate these parameters for each waste Summary Category Group.

B-3 Generator Waste Characterization Methods

The characterization techniques used by generator/storage sites includes acceptable knowledge and may also include, as necessary, ~~, which incorporates confirmation by~~ headspace-gas sampling and analysis, radiography, visual examination, and homogeneous waste sampling and analysis. All ~~confirmation~~ characterization activities are performed in accordance with the WAP. Table B-~~6~~5 provides a summary of the characterization requirements for TRU mixed waste.

~~TRU mixed waste may be characterized in lots (Section B-1a) and/or batches. A sampling batch can be up to 20 samples (excluding field QC samples), all of which shall be collected within 14 days of the first sample in the batch. An analytical batch can be up to 20 samples (excluding~~

~~laboratory QC samples), all of which shall be received by the laboratory within 14 days of the validated time of sample receipt of the first sample in the batch. For on-line integrated headspace-gas sampling/analytical systems, samples will be collected within a 12-hour period using the same on-line integrated sampling/analysis system. The analytical requirements are specified by the analytical method being used in the on-line system (e.g., FTIR, GC/MS). Refer to Permit Attachment B3 for additional clarification regarding the expected contents of Batch Data Reports.~~

B-3a Sampling and Analytical Methods

B-3a(1) Headspace Gas Sampling and Analysis

Representative headspace gas sampling and analysis shall be used by generator/storage sites to determine the types and concentrations of VOCs in the void volume of randomly selected waste containers in order to resolve the assignment of EPA hazardous waste numbers for those debris waste streams for which an AK Sufficiency Determination Request has not been approved by the Permittees. ~~Headspace-gas samples are used to determine the types and concentrations of VOCs in the void volume of waste containers. Measured headspace VOC concentrations in waste containers received at the WIPP facility will be compared routinely and in accordance with requirements of Permit Attachment N to ensure that, on an annual basis, there are no associated adverse worker or public-health impacts.~~ In addition, VOC constituents will be compared to those assigned by acceptable knowledge, ~~and the Permittees will assign hazardous waste codes, as warranted. This comparison~~ which may include an analysis of radiolytically derived VOCs. The ~~Permittees~~ generator/storage sites may also consider radiolysis and packaging materials when assessing the presence of ~~listed waste~~ hazardous constituents in the headspace gas results, and whether radiolysis would generate wastes which exhibit the toxicity characteristic. Refer to Permit Attachment B4 for additional clarification regarding hazardous waste ~~code~~ number assignment and headspace gas results. The methods for random selection of containers for headspace gas sampling and analysis are specified in Permit Attachment B2. Headspace gas sampling and analysis shall be subject to the Permittees' Audit and Surveillance Program (Permit Attachment B6).

~~With the exception of qualifying Los Alamos National Laboratory (**LANL**) sealed sources waste containers, every TRU mixed waste container or statistically selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in this section will be sampled and analyzed to determine the concentrations of VOCs (presented in Table B-3) in headspace gases. LANL sealed sources waste containers that meet the conditions specified in B-3a(1)(iii) must be assigned VOC concentration values in accordance with Section B-3a(1)(iii). If composite samples are used, containers used in the composite sample must be from the same waste stream with no more than 20 containers being included in a single composite sample. Sampling protocols, equipment, and QA/QC methods for headspace-gas sampling are provided in Permit Attachment B1.~~ In accordance with EPA convention, identification of hazardous constituents detected by gas chromatography/mass spectrometry methods that are not on the list of target analytes shall be reported. These compounds are reported as tentatively identified compounds (**TICs**) in the analytical ~~batch data report~~ BDR and shall be added to the target analyte list if detected in a given waste stream, if they appear in the 20.4.1.200 NMAC (incorporating 40 CFR §261) Appendix VIII, and if they are reported in 25% of the waste containers sampled from a given waste stream. The headspace gas analysis method Quality Assurance Objectives (**QAOs**) are specified in Permit Attachment B3.

~~B-3a(1)(i) Reduced Sampling Requirements for Homogeneous Solid or Soil/Gravel Waste Streams with no VOC-Related Hazardous Waste Codes~~

~~Headspace gas sampling of homogeneous solid and soil/gravel wastes that have no VOC-related hazardous waste codes assigned may qualify for reduced headspace sampling if they meet the following criteria:~~

- ~~The waste stream or waste stream lot must consist of more than 10 containers.~~
- ~~The waste stream must be a homogeneous solid or soil/gravel waste stream that has no VOC-related hazardous waste codes assigned to it.~~
- ~~The results of the solid sampling and analysis must confirm that no VOC-related hazardous waste codes should be assigned to the waste stream.~~

~~If a waste stream meets these conditions for reduced headspace gas sampling, generator/storage sites may choose to randomly select containers for headspace gas sampling and analysis using the statistical approach in Permit Attachment B2, Section B2-2b.~~

~~B-3a(1)(ii) Reduced Sampling Requirements for Thermally Treated Waste Streams~~

~~Headspace gas sampling of wastes that have undergone high-temperature thermal processes may qualify for reduced headspace sampling if they meet the following criteria:~~

- ~~The waste stream or waste stream lot must consist of more than 10 containers.~~
- ~~The waste stream must have either been generated using a high-temperature thermal process or been subjected to a high-temperature thermal process after generation that resulted in the reduction of matrix-related VOCs in the headspace to concentrations below the PRQLs in Permit Attachment B3, Table B3-2.~~
- ~~The site must have documentation demonstrating that high-temperature thermal processes were used.~~

~~If a waste stream meets these conditions for reduced headspace gas sampling, generator/storage sites may choose to randomly select containers for headspace gas sampling and analysis using the statistical approach in Permit Attachment B2, Section B2-2b.~~

~~B-3a(1)(iii) Sampling Requirements for Waste Containers of LANL Sealed Sources Waste Streams~~

~~Headspace gas sampling and analysis of a waste container containing a pipe overpack component belonging to a LANL sealed sources waste stream is not required if compliance with the following criteria has been determined and documented by LANL for its individual contents:~~

- ~~All LANL sealed sources will be characterized as newly generated waste.~~

- ~~The waste container contents meet the definition of sealed sources per 10 CFR §30.4 and 10 CFR §835.2 (effective January 1, 2004), evidence of which must be assembled as part of the AK documentation.~~

- ~~Sealed sources must be the only non-packaging items in the waste container, which must be verified using the VE technique at the time of packaging.~~

- ~~The sealed sources must be U.S. Department of Transportation Special Form Class 7 (Radioactive) Material per 49 CFR §173.403 (effective October 1, 2003), the certification of which must be assembled as part of the AK documentation.~~

- ~~The integrity of each sealed source must be validated by documented contamination survey results to meet the requirements of 10 CFR §34.27 (effective January 1, 2004), which must be assembled as part of the AK documentation.~~

- ~~Each sealed source must be, or be contained in, a rigid sealed container less than or equal to 4 liters in size, which must be verified using the VE technique at the time of packaging.~~

- ~~AK documentation does not indicate the use of VOCs or VOC-bearing materials as constituents of the sealed sources.~~

- ~~The outer casing of each sealed source must be of a non-VOC bearing material, which must be verified using the VE technique at the time of packaging.~~

~~A packaging VOC source term for waste containers meeting these criteria must be established on a waste-stream basis for each headspace target analyte listed in Table B-3 as follows:~~

- ~~Samples must be collected from the headspace of a minimum of five containers, each containing only packaging materials typical and representative of the packaging materials used in containers belonging to the LANL sealed sources waste stream under consideration. In no case is this sampling required to occur on containers that hold sealed sources. Each headspace gas sample must be analyzed for the target analytes listed in Table B-3. Using the statistical approach in Permit Attachment B2, Section B2-3b, VOC concentration values shall be calculated. For each result that is nondetectable, the value calculated as one-half the method detection limit shall be used. For all detectable results, the mean values shall be used. The calculated VOC concentration values shall be assigned to each waste container meeting the criteria of this section.~~

- ~~Sampling and analysis must be managed in accordance with this Permit using an approved LANL headspace gas sampling and analysis program.~~

~~C The VOC source term also must be re-evaluated if any significant change (e.g., change in material or change in manufacturer) is made to the packaging materials used in the sealed sources waste stream.~~

~~If a waste container meets these criteria, concentrations for the headspace gas target analytes (Table B-3) must be assigned based on the VOC source term developed as described above. The assignment of VOC concentration values for qualifying waste containers belonging to LANL sealed sources waste streams must be managed as documented and approved in the LANL QAPjP.~~

B-3a(2) Homogeneous and Soil/Gravel Waste Sampling and Analysis

Representative homogeneous and soil/gravel waste sampling and analysis shall be used by generator/storage sites to resolve the assignment of EPA hazardous waste numbers for homogeneous and soil/gravel waste streams for which an AK Sufficiency Determination Request has not been approved by the Permittees. Sampling of homogeneous and soil/gravel wastes shall result in the collection of a sample that is used to ~~confirm~~ verify hazardous waste ~~code~~ number assignment by acceptable knowledge. Sampling is accomplished through ~~core~~ coring or other EPA approved sampling, which is described in Permit Attachment B1.For those waste streams defined as Summary Category Groups S3000 or S4000 on page B-3, debris that may also be present within these wastes need not be sampled. The waste containers for sampling and analysis are to be selected randomly from the population of containers for the waste stream. The random selection methodology is specified in Permit Attachment B2. Homogeneous and soil/gravel sampling and analysis shall be subject to the Permittees' Audit and Surveillance Program (Permit Attachment B6).

Totals or TCLP analyses for VOCs, SVOCs, and RCRA-regulated metals are used to determine waste parameters in soils/gravels and solids that may be important to the performance within the disposal system (Tables B-~~4~~3 and B-~~5~~4). To determine if a waste exhibits a toxicity characteristic for compounds specified in 20.4.1.200 NMAC (incorporating 40 CFR §261, Subpart C), TCLP may be used instead of total analyses. The generator will use the results from these analyses to determine if a waste exhibits a toxicity characteristic. The mean concentration of toxicity characteristic contaminants are calculated for each waste stream such that it can be reported with an upper 90 percent confidence limit (**UCL_{90}**). The UCL_{90} values for the mean measured contaminant concentrations in a waste stream will be compared to the specified regulatory levels in 20.4.1.200 NMAC (incorporating 40 CFR §261 Subpart C), expressed as total/TCLP values, to determine if the waste stream exhibits a toxicity characteristic. A comparison of total analyses and TCLP analyses is presented in Appendix C3 of the WIPP RCRA Part B Permit Application (DOE, 1997), and a discussion of the UCL_{90} is included in Permit Attachment B2. If toxicity characteristic (**TC**) wastes are identified, these will be compared to those determined by acceptable knowledge and TC waste ~~codes~~ numbers will be revised, as warranted. Refer to Permit Attachment B4 for additional clarification regarding hazardous waste ~~code~~ number assignment and homogeneous solid and soil/gravel analytical results.

B-3a(3) Laboratory Qualification

The Permittees will ensure that generator/storage sites conduct analyses using laboratories that are qualified through participation in the Performance Demonstration Program (**PDP**) (DOE, ~~1995c, d~~ 2003, 2005). Required QAOs are specified in Permit Attachment B3. In addition, methods and supporting performance data demonstrating QAO compliance shall be ensured by the Permittees during the annual certification audit of the laboratories.

Analytical methods used by the laboratories shall: 1) satisfy all of the appropriate QAOs, and 2) be implemented through laboratory-documented standard operating procedures. These analytical QAOs are discussed in detail in Permit Attachment B3.

B-3b Acceptable Knowledge

Acceptable knowledge (**AK**) is used in TRU mixed waste characterization activities in ~~three~~ five ways:

- To delineate TRU mixed waste streams
- To assess whether TRU mixed wastes comply with the TSDF-WAC
- To assess whether TRU mixed ~~heterogeneous debris~~ wastes exhibit a ~~toxicity~~ hazardous characteristic (20.4.1.200 NMAC, incorporating 40 CFR §261~~.24~~ Subpart C)
- To assess whether TRU mixed wastes are listed (20.4.1.200 NMAC, incorporating 40 CFR §261~~.31~~ Subpart D)
- To estimate waste material parameter weights

Acceptable knowledge is discussed in detail in Permit Attachment B4, which outlines the minimum set of requirements and DQOs which shall be met by the generator/storage sites in order to use acceptable knowledge. In addition, Section B-~~4b(1)~~5a of this permit attachment describes the ~~verification~~ assessment of acceptable knowledge through ~~sampling and analysis and~~ the Permittees' Audit and Surveillance Program.

B-3c Radiography and Visual Examination

Radiography is a nondestructive qualitative and quantitative technique that involves X-ray scanning of waste containers to identify and verify waste container contents. Visual examination (**VE**) constitutes opening a container and physically examining its contents. Generator/storage sites shall perform radiography or VE on 100 percent of containers in waste streams where acceptable knowledge does not substantiate the absence of prohibited items. Radiography and/or visual examination will be used, when necessary, to examine ~~every~~ a waste container to verify its physical form. These techniques can detect liquid wastes and containerized gases, which are prohibited for WIPP disposal. The prohibition of liquids and containerized gases prevents the shipment of corrosive, ignitable, or reactive wastes. Radiography and/or VE ~~will~~ are also ~~be~~ able to confirm that the physical form of the waste matches its waste stream description (i.e. Homogeneous Solids, Soil/Gravel, or Debris Waste [including uncategorized metals]). If the physical form does not match the waste stream description, the waste will be designated as another waste stream and assigned the preliminary hazardous waste codes associated with that new waste stream assignment. That is, if radiography and/or VE indicates that the waste does not match the waste stream description arrived at by acceptable knowledge characterization, a non-conformance report will be completed and the inconsistency will be resolved as specified in Permit Attachment B4. The proper waste stream assignment will be determined (including preparation of a new WSPF), the correct hazardous waste codes will be assigned, and the resolution will be documented. Refer to Permit Attachment B4 for a discussion of acceptable knowledge and its ~~confirmation~~ verification process.

Generator/storage sites may conduct visual examination of waste containers in lieu of radiography. For generator/storage sites that choose to use visual examination in lieu of radiography, the detection of any liquid waste in non-transparent inner containers, detected from shaking the container, will be handled by assuming that the container is filled with liquid and adding this volume to the total liquid in the payload container (e.g., 55 gallon drum or SWB). The payload container would be rejected and/or repackaged to exclude the container if it is over the TSDF-WAC limits. When radiography is used, or visual examination of transparent containers is performed, if any liquid in inner containers is detected, the volume of liquid shall be added to the total for the payload container. Radiography, or the equivalent, will be used as necessary on the existing/stored waste containers to verify the physical characteristics of the TRU mixed waste correspond with its waste stream identification/waste stream Waste Matrix Code and to identify prohibited items. ~~The results of radiography are verified through visual examination of a statistically selected subpopulation of TRU mixed waste containers in each TRU mixed waste summary category group as specified in Permit Attachment B2.~~ Radiographic examination protocols and QA/QC methods are provided in Permit Attachment B1. Radiography and VE shall be subject to the Permittees' Audit and Surveillance Program (Permit Attachment B6).

B-3d Characterization Techniques and Frequency for Newly Generated and Retrievably Stored Waste

Generator/storage sites will use acceptable knowledge to delineate all TRU mixed waste containers into waste streams for the purposes of grouping waste for further characterization. The analyses performed ~~will not~~ may differ based on the waste stream and~~, only on~~ the physical form of the waste (i.e., heterogeneous debris waste cannot be sampled for totals analyses). Both retrievably stored and newly generated wastes will be delineated in this fashion, though the types of acceptable knowledge used may differ. Section B-3b discusses the use of acceptable knowledge, sampling, and analysis in more detail. Acceptable knowledge is discussed more completely in Permit Attachment B4. Every TRU mixed waste stream will be assigned hazardous waste ~~codes~~ numbers based upon acceptable knowledge, and the ~~Permittees will confirm~~ generator/storage sites may verify these designations using headspace gas (all Summary Category Groups) and solid sampling and analysis (Summary Category Groups S3000 and S4000 only).

In the CIS for each waste stream, the generator/storage site will be required to document their methods, and the findings from those methods, for determining the physical form of the waste and the presence or absence of prohibited items for both retrievably stored and newly generated waste. Radiography and/or VE ~~will~~ may be used to verify the physical form of retrievably stored TRU mixed waste. For newly generated waste, physical form and prohibited items ~~will~~ may either be ~~verified~~ documented during packaging (using the VE technique) or ~~will be~~ verified after packaging using radiography (or VE in lieu of radiography). ~~Generator/storage sites may use either the VE technique or radiography, separately or together, as long as 100% of the containers undergo confirmation of AK. Radiography and/or VE will also be used in conjunction with acceptable knowledge to characterize heterogeneous debris wastes. Radiography and/or VE, and the associated information compiled from acceptable knowledge (e.g., age of the waste, generating process) will be used to determine the RCRA-regulated constituents present in the waste. VE, the VE technique, and/or radiography shall be performed prior to any treatment designed to supercompact waste prior to shipment.~~

For debris waste streams that do not have an AK Sufficiency Determination approved by the Permittees, ~~With the exception of qualifying LANL sealed sources waste containers, all waste containers (retrievably stored and newly generated) or randomly selected~~ containers selected in accordance with Permit Attachment B2 from those waste streams ~~that meet the conditions for reduced headspace gas sampling listed in Section B-3a(1) are~~ must be sampled and analyzed for VOCs in the headspace gas. ~~The LANL sealed sources waste containers that meet specified conditions must be assigned VOC concentration values in accordance with Section B-3a(1)(iii).~~ ~~A~~ Likewise, a statistically selected portion of ~~each~~ homogeneous solids and soil/gravel waste streams must be ~~is~~ sampled and analyzed for RCRA-regulated total VOCs, SVOCs, and metals ~~(see Permit Attachment B2)~~ when those waste streams do not have an AK Sufficiency Determination approved by the Permittees. Sampling and analysis methods used for waste characterization are discussed in Section B-3a.

In the process of performing organic headspace and solid sample analyses, nontarget compounds may be identified. These compounds will be reported as TICs. TICs reported in 25% of the samples and listed in 20.4.1.200 NMAC (incorporating 40 CFR §261) Appendix VIII, will be compared with acceptable knowledge data to determine if the TIC is in a listed hazardous waste in the waste stream. TICs identified through headspace gas analyses that meet the Appendix VIII list criteria and the 25 percent reporting criteria for a waste stream will be added to the headspace gas waste stream target list, regardless of the hazardous waste listing associated with the waste stream. TICs subject to inclusion on the target analyte list that are toxicity characteristic parameters shall be added to the target analyte list regardless of origin because the hazardous waste designation for these ~~codes~~ numbers is not based on source. However, for toxicity characteristic and non-toxic F003 constituents, the site may take concentration into account when assessing whether to add a hazardous waste ~~code~~ number. TICs reported from the Totals VOC or SVOC analyses may be excluded from the target analyte list for a waste stream if the TIC is a constituent in an F-listed waste whose presence is attributable to waste packaging materials or radiolytic degradation from acceptable knowledge documentation. If the TIC associated with a total VOC or SVOC analysis cannot be identified as a component of waste packaging materials or as a product of radiolysis, the ~~Permittees~~ generator/storage site will add these TICs to the list of hazardous constituents for the waste stream (and assign additional EPA listed hazardous waste ~~codes~~ numbers, if appropriate). A permit modification will be submitted to NMED for their approval to add these constituents (and waste ~~codes~~ numbers), if necessary. For toxicity characteristic compounds and non-toxic F003 constituents, the ~~Permittees~~ generator/storage site may consider waste concentration when determining whether to change a hazardous waste ~~code~~ number. Refer to Permit Attachment B3 for additional information on TIC identification.

Waste characterization solid sampling and analysis activities may differ for retrievably stored waste and newly generated waste. The waste characterization processes used by the generator/storage sites for both retrievably stored and newly generated waste streams will be evaluated during the Permittees' audit of the site. The typical waste characterization data collection design used by the generator/storage sites for each type of waste is described in the following sections. Table B-1 provides a summary of hazardous waste characterization requirements for all TRU mixed waste by waste characterization parameters.

Table B-~~6~~5 summarizes the parameters, methods, and rationales for stored and newly generated CH TRU mixed wastes according to their waste forms.

WIPP may accept TRU mixed waste that has been repackaged or treated. ~~Repackaged or treated waste shall undergo characterization required of newly generated waste except that solids sampling for repackaged or treated S3000 waste may be characterized as retrievably stored waste if the generator/storage sites demonstrates that control charting cannot be applied effectively to the repackaging or treatment process. Repackaged waste shall also undergo headspace gas analysis, and payload container headspace shall be sampled after repackaging, as long as the criteria specified in Permit Attachment B1-1 are met.~~ Treated waste shall retain the original waste stream's listed hazardous waste ~~code~~ number designation.

B-3d(1) Newly Generated Waste

The RCRA-regulated constituents in newly generated wastes will typically be documented at the time of generation based on acceptable knowledge for the waste stream. Newly generated TRU mixed waste characterization ~~will~~ typically begins with verification that processes generating the waste have operated within established written procedures. Waste containers are delineated into waste streams using acceptable knowledge. The Permittees will require that the generator/storage sites document the methods used to delineate waste streams in the acceptable knowledge record and Acceptable Knowledge Summary Report. Verification that the physical form of the waste (Summary Category Group) corresponds to the physical form of the assigned waste stream ~~is~~ may be accomplished either during packaging ~~(using the VE technique)~~ or by performing radiography as specified in Attachment B1-3 for retrievably stored waste. ~~Generator/storage sites may use either the VE technique or radiography, separately or together, as long as 100% of the containers undergo confirmation of AK. If the VE technique is used, it is different than the VE process described in Attachment B1-3b(3) and consists of the operator confirming that the waste is assigned to a waste stream that has the correct Summary Category Group for the waste being packaged. If a confirmation cannot be made, corrective actions will be taken as specified in Permit Attachment B3.~~ Instead of using a video/audio tape as required with VE in ~~support~~ lieu of radiography ~~in Attachment B1-3b(3)~~, the VE ~~technique~~ method for newly generated waste (or repackaged retrievably stored waste) uses a second operator, who is equally trained to the requirements stipulated in Permit Attachment B1, to provide additional verification by reviewing the contents of the waste container to ensure correct reporting. If the second operator cannot provide concurrence, corrective actions[3] will be taken as specified in Permit Attachment B3. The subsequent waste characterization activities depend on the assigned Summary Category Group, since waste within the Homogeneous Solids and Soils/Gravel Summary Category Groups ~~will~~ may be characterized using different techniques than the waste in the Debris Waste Summary Category Group. The packaging configuration, type and number of filters, and rigid liner vent hole presence and diameter necessary to determine the appropriate drum age criteria (**DAC**) in accordance with Permit Attachment B1, Section B1-1, ~~shall~~ may be documented as part of the characterization information collected during the packaging of newly generated waste or repackaging of retrievably stored waste. ~~If retrievably stored waste is characterized in the same manner as newly generated waste due to unacceptable AK (see Section B-1a), the option to perform radiography in lieu of or in combination with the VE technique does not apply.~~

~~With the exception of qualifying LANL sealed sources waste containers, all containers of newly generated waste or newly generated waste containers randomly selected from waste streams that meet the conditions for reduced headspace gas sampling listed in Section B-3a(1) will undergo headspace-gas analysis for VOC concentrations prior to shipment. The LANL sealed sources waste containers that meet specified conditions must be assigned VOC concentration values in accordance with Section B-3a(1)(iii). If the Permittees believe the frequency can be reduced in the future based on trends in analytical results, they may provide technical arguments for such a reduction and request a permit modification from NMED. The headspace-gas sampling method is provided in Permit Attachment B1. Headspace gas data will be used to confirm acceptable knowledge waste characterization, as specified in Permit Attachment B4.~~

B-3d(1)(a) <u>Sampling of Newly Generated Homogeneous Solids and Soil/Gravel</u>

When a Determination Request has not been approved by the Permittees, sampling and analysis of newly generated homogeneous solid and soil/gravel waste streams shall be conducted in accordance with the requirements specified in Permit Attachment B1, Section B1-2. The number of newly generated homogeneous solid and soil/gravel waste containers to be sampled will be determined using the procedure specified in Section B2-1, wherein a statistically selected portion of the waste will be sampled. ~~Newly generated mixed waste streams of homogeneous solids will be randomly sampled a minimum of once per year for total VOCs, SVOCs and metals. An initial ten-sample set, however, will be collected to develop the baseline control chart. Sampling frequency of once per year is only allowed if a process has operated within procedurally established bounds without any process changes or fluctuations which would result in either a new waste stream or the identification of a new hazardous waste constituent in that waste stream. Otherwise, the waste shall be considered as process batches and each batch will undergo sampling and analysis. Process changes and process fluctuations will be determined using statistical process control charting techniques; these techniques require the ten-sample baseline and historical data for determining limits for indicator species and subsequent periodic sampling to assess process behavior relative to historical limits. If the limits are exceeded, the waste stream shall be recharacterized, and the characterization shall be performed according to procedures required for retrievably stored waste (i.e., waste~~

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[3] "Corrective action" as used in this WAP and its attachments does not mean corrective action as defined under HWA, RCRA, and their implementing regulations.

~~sampling frequency will be increased). The process behind this control charting technique is described in Permit Attachment B2.~~

~~Also, as another control of waste generated from a particular process, the bounds for a waste generating process will be established by specific written procedures for that process. Examples of parameter bounds that could affect a waste generated by a process are volumes of input material, change in the input material, and any other changes that would change the output of that process.~~

~~To ensure that the generator/storage site procedures for waste generating processes include controls of the waste stream, these procedures will consist of sections containing the following information:~~

- ~~Responsible organizations for implementing the requirements of the procedure~~
- ~~Material inputs~~
- ~~Waste streams generated~~
- ~~Process controls and range of operation (bounds) that affect final hazardous waste determinations~~
- ~~Rate and quantity of hazardous waste generated~~
- ~~List of applicable operating procedures relevant to the hazardous waste determination~~

~~Events where procedurally established bounds are exceeded or any condition of normal operation is not being met could trigger an increased sampling frequency of a waste stream. As long as a process does not change outside of established bounds within a year, the waste generated by that process will have the same characteristics, and therefore, a minimum of one sample will be collected annually to verify the lack of variability of that waste stream. Compliance with process procedures and the maintenance of the parameters specified by those procedures will be verified by the Permittees during the Permittees' Audit and Surveillance Program (Permit Attachment B6).~~

~~The records generated by the process procedures will be examined weekly for indications of process changes or limits being exceeded that would change the hazardous constituents identified in the waste stream or add relevant prohibited materials. If these changes are discovered, the Permittees will notify NMED and will not manage, store or dispose the waste stream until a follow-up sample of process waste is collected and analyzed to assess whether the container contents are within those identified on the WSPF. If the second analysis is not consistent with the WSPF information, all waste containers in question will be segregated and a WSPF and waste generation procedures/bounds will be established. Records of that analysis will be available for examination by the auditors and will be provided to NMED upon request. If records of the analysis are not available, the Permittees will not accept the waste stream at the WIPP facility for disposal. If a generator/storage site changes a process but determines that increased sampling is not required because the change will not affect waste generated by that~~

~~process, the Permittees and NMED shall be notified in the form of a memorandum to the DOE's Carlsbad Field Office (**CBFO**) Waste Characterization Manager. The Permittees shall concur with the decision to not increase the sampling frequency before any additional waste from that process is shipped, and NMED will be notified of the Permittees' decision.~~

~~The toxicity characteristics of newly generated homogeneous solids and soils/gravel waste streams will be determined using total analysis of toxicity characteristic contaminants or TCLP. To determine if a waste exhibits a toxicity characteristic for compounds specified in 20.4.1.200 NMAC (incorporating 40 CFR §261, Subpart C), TCLP may be used instead of total analyses. The sampling methods for homogeneous solids and soil/gravel wastes are provided in Permit Attachment B1.~~

~~B-3d(1)(b) Sampling of Newly Generated Soils/Gravels~~

~~Newly generated soils/gravel waste will be generated primarily by remediation or decontamination and decommissioning (**D&D**) activities. Process controls for these types of waste cannot readily be defined and, therefore, sampling cannot follow that used for newly generated homogeneous waste. The number of newly generated soils/gravel waste containers to be sampled will be determined using the procedure specified in Section B-3a(2), wherein a statistically selected portion of the waste will be sampled. The generators shall estimate the number of containers to be sampled within the waste stream based on the expected volume of the waste stream and whether SWB or 55-gallon drum containers will be used. Refer to Permit Attachment B2 for additional information.~~

B-3d(2) Retrievably Stored Waste

All retrievably stored waste containers will first be delineated into waste streams using acceptable knowledge. The Permittees will require that the generator/storage sites document the methods used to delineate waste streams in the acceptable knowledge record and Acceptable Knowledge Summary Report. Retrievably ~~All retrievably~~ stored waste containers ~~will~~ may be examined using radiography or VE to ~~confirm~~ verify the physical waste form (Summary Category Group), to verify the absence of prohibited items, and to determine ~~the~~ additional waste characterization techniques ~~to~~ that may be used based on the Summary Category Groups (i.e., S3000, S4000, S5000). ~~Repackaged retrievably stored waste, or any retrievably stored waste with inadequate acceptable knowledge, will be characterized using either the retrievably stored or newly generated waste characterization process, whichever results in greater sampling requirements, unless it is demonstrated that control charting cannot be applied effectively. Solids sampling for repackaged or treated S3000 waste may be characterized as retrievably stored waste if the generator/storage sites demonstrates that control charting cannot be applied effectively to the repackaging or treatment process This determination by the generator/storage site must be documented on the Characterization Information Summary and will be examined by the Permittees during audits (Permit Attachment B6). In this case, the minimum number of solids samples required for any S3000 waste stream or waste stream lot is the number of samples determined in accordance with Section B2-2a. Radiographic results will be compared to acceptable knowledge results to ensure correct Waste Matrix Code assignment and identification of prohibited items. If radiographic analysis do not confirm the physical waste form, waste will be reassigned as specified in Section B-3c. Generator/storage sites may elect to substitute visual examination for radiographic analysis.~~

~~To confirm the results of radiography, a statistically selected number of the TRU mixed waste container population will be visually examined by opening containers to inspect waste contents to verify radiography results. Permit Attachment B2 contains the approach used to statistically select the number of drums to be visually examined. For homogeneous waste and soils/gravels selected for sampling, the containers opened for sampling may be used to help fulfill the visual examination requirements.~~

~~With the exception of qualifying LANL sealed sources waste containers, all retrievably stored containers or retrievably stored containers randomly selected from waste streams that meet the conditions for reduced headspace gas sampling listed in Section B-3a(1) will undergo headspace gas analysis for VOC concentrations. The LANL sealed sources waste containers that meet specified conditions must be assigned VOC concentration values in accordance with Section B-3a(1)(iii). Retrievably stored waste that is repackaged will be subject to the DAC determination specified in Section B-3d(1).~~ The headspace gas sampling method ~~is~~ provided in Permit Attachment B1~~. All headspace gas data~~ will be used, when necessary, to resolve the assignment of EPA hazardous waste numbers to debris waste streams ~~confirm acceptable knowledge waste characterization~~, as specified in Permit Attachment B4.

A statistically selected portion of retrievably stored homogeneous solids and soil/gravel wastes will be sampled and analyzed for total VOCs, SVOCs, and metals, when necessary. ~~The approach used to statistically select drums for homogeneous solids and soil/gravel wastes is different than the method used to select waste containers for visual examination. This method is also included~~ The sample location selection method is described in Permit Attachment B2. The sampling methods for these wastes are provided in Permit Attachment B1.

The toxicity characteristic of retrievably stored homogeneous solids and soil/gravel wastes will be determined using total analysis of toxicity characteristic parameters or TCLP. To determine if a waste exhibits a toxicity characteristic for compounds specified in 20.4.1.200 NMAC (incorporating 40 CFR §261, Subpart C), TCLP may be used instead of total analyses. Appendix C3 of the WIPP RCRA Part B Permit Application (DOE, 1997) discusses comparability of totals analytical results to those of the TCLP method.

Representativeness of containers selected for ~~visual examination~~ headspace gas sampling and waste subjected to homogeneous solids and soil/gravel sampling and analysis will be validated by the generator/storage site and by the Permittees during an audit (Permit Attachment B6) via examination of documentation that shows that ~~true~~ random samples were collected. (Because representativeness is a quality characteristic that expresses the degree to which a sample or group of samples represent the population being studied, the random sampling of waste streams ensures representativeness.)

B-4 Data Verification and Quality Assurance

The Permittees will ~~assure~~ ensure that applicable waste characterization processes performed by generator/storage sites sending TRU mixed waste to the WIPP for disposal meets WAP requirements through data validation, usability and reporting controls. Verification occurs at three levels: 1) the data generation level, 2) the project level, and 3) the Permittee level. The validation and verification process and requirements for the data generation and project level are ~~at each level is~~ described in Section B3-10. The validation and verification process at the Permittee Level is described in Attachment B7.

B-4a Data Generation and Project Level Verification Requirements

B-4a(1) Data Quality Objectives

The waste characterization data obtained through WAP implementation will be used to ensure that the Permittees meet regulatory requirements with regard to both regulatory compliance and to ensure that all TRU mixed wastes are properly managed during the Disposal Phase. To satisfy the RCRA regulatory compliance requirements, the following DQOs are established by this WAP:

- Acceptable Knowledge
  - To delineate TRU mixed waste streams.
  - To assess whether TRU mixed wastes comply with the TSDF-WAC.
  - To assess whether TRU mixed wastes exhibit a hazardous characteristic (20.4.1.200 NMAC, incorporating 40 CFR §261 Subpart C).
  - To assess whether TRU mixed wastes are listed (20.4.1.200 NMAC, incorporating 40 CFR §261, Subpart D).
  - To estimate waste material parameter weights.
- Headspace-Gas Sampling and Analysis
  - To identify VOCs and quantify the concentrations of VOC constituents in ~~the total waste inventory to ensure compliance with the environmental performance standards of 20.4.1.500 NMAC (incorporating 40 CFR, §264.601(c)), and to confirm~~ waste containers to resolve the assignment of EPA hazardous waste numbers ~~identification by acceptable knowledge.~~
- Homogeneous Waste Sampling and Analysis
  - To compare UCL_{90} values for the mean measured contaminant concentrations in a waste stream with specified toxicity characteristic levels in 20.4.1.200 NMAC (incorporating 40 CFR §261), to determine if the waste is hazardous, and to ~~confirm~~ resolve the assignment of EPA hazardous waste numbers ~~identification by acceptable knowledge~~.
  - ~~To report the average concentration of hazardous constituents in a waste stream, as specified in 20.4.1.200 NMAC (incorporating 40 CFR §261) Appendix VIII, with a 90 percent confidence interval, with all averages greater than PRQL considered a detection and subsequent assignment of~~

~~the waste (if an adequate explanation for the constituent cannot be determined) as a hazardous waste, and to confirm hazardous waste identification by acceptable knowledge.~~

- Radiography
  - To verify the TRU mixed waste streams by Waste Matrix Code for purposes of physical waste form identification and determination of sampling and analytical requirements, to identify prohibited items, and to confirm the waste stream delineation by acceptable knowledge.

- Visual Examination
  - To verify the TRU mixed waste streams by Waste Matrix Code for purposes of physical waste form identification, determination of sampling and analytical requirements, and to identify prohibited items.
  - ~~To provide a process check on a sample basis by verifying the information determined by radiography, and to confirm the waste stream delineation by acceptable knowledge.~~

Reconciliation of these DQOs by the Generator/Storage Site Project Manager or the Permittee approved laboratories, as applicable, is addressed in Permit Attachment B3. Reconciliation requires determining whether sufficient type, quality, and quantity of data have been collected to ensure the DQO's cited above can be achieved.

B-4a(2) Quality Assurance Objectives

The generator/storage sites or the Permittee approved laboratories, as applicable, shall demonstrate compliance with each QAO associated with the various characterization methods as presented in Permit Attachment B3. Generator/Storage Site Project Managers or the Permittee approved laboratories, as applicable, are further required to perform a reconciliation ~~at the project level~~ of the data ~~sets submitted by the various organizations at the generator/storage site~~ with the DQOs established in this WAP. The Generator/Storage Site Project Manager or the Permittee approved laboratories, as applicable, shall conclude that all of the DQOs have been met for the characterization of the waste stream prior to submitting a WSPF to the Permittees for approval (Permit Attachment B3). The following QAO elements shall be considered for each technique, as a minimum:

- Precision
  - Precision is a measure of the mutual agreement among multiple measurements.

- Accuracy
  - Accuracy is the degree of agreement between a measurement result and the true or known value.

- Completeness
  - Completeness is a measure of the amount of valid data obtained from a method compared to the total amount of data obtained that is expressed as a percentage.
- Comparability
  - Comparability is the degree to which one data set can be compared to another.
- Representativeness
  - Representativeness expresses the degree to which data represent characteristics of a population.

A more detailed discussion of the QAOs, including a mathematical representation, where appropriate, can be found in Permit Attachment B3, which describes the QAOs associated with each method of sampling and analysis.

B-4a(3) Sample Control

The generator/storage sites and Permittee approved laboratories, as applicable, will implement a sample handling and control program that will include the maintenance of field documentation records, proper labeling, and a chain of custody (**COC**) record. The generator/storage site and Permittee approved laboratories, as applicable, Quality Assurance Project Plan (**QAPjP**) or procedures referenced in the QAPjP will document this program and include COC forms to control the sample from the point of origin to the final analysis result reporting. The Permittees will review and approve the QAPjP, including their determination that the sample control program is adequate. The approved QAPjP will be provided to NMED prior to shipment of TRU mixed waste and before the generator/storage site audit, as specified in Permit Attachment B5. Details of this sample control program are provided in Permit Attachment B1 and are summarized below to include:

- Field Documentation of samples including: point of origin, date of sample, container ID, sample type, analysis requested, and COC number.
- Labeling and/or tagging including: sample numbering, sample ID, sample date, sampling conditions, and analysis requested.
- COC control including: name of sample relinquisher, sample receiver, and the date and time of the sample transfer.
- Proper sample handling and preservation.

B-4a(4) Data Generation

~~Batch Data Reports,~~ BDRs, in a format approved by the Permittees, will be used by each generator/storage site and Permittee approved laboratories, as applicable, for reporting waste characterization data. This format will be included in the generator/storage site and Permittee approved laboratories, as applicable, QAPjP, controlled electronic databases, or procedures referenced in the QAPjP (Permit Attachment B5) and will include all of the elements required by this WAP for ~~Batch Data Reports~~ BDR (Permit Attachment B3).

The Permittees shall perform audits of the generator/storage site waste characterization programs, as implemented by the generator/storage site QAPjP, to verify compliance with the WAP and the DQOs in this WAP (See Permit Attachment B6 for a discussion of the content of the audit program). The primary functions of these audits are to review generator/storage sites' adherence to the requirements of this WAP and ~~assure~~ ensure adherence to the WAP characterization program. The Permittees shall provide the results of each audit to NMED. If audit results indicate that a generator/storage site is not in compliance with the requirements of this WAP, the Permittees will take appropriate action as specified in Permit Attachment B6.

The Permittees shall perform audits of the Permittee approved laboratory's programs, as implemented by the laboratory's QAPjP (See Permit Attachment B6 for a discussion of the content of the audit program). The primary functions of these audits are to review the Permittee approved laboratory's adherence to the requirements of this WAP. The Permittees shall provide the results of each audit to NMED. If audit results indicate that a Permittee approved laboratory is not in compliance with the requirements of this WAP, the Permittees will take appropriate action as specified in Permit Attachment B6.

The Permittees shall further require all ~~analytical~~ Permittee approved laboratories analyzing WIPP waste ~~characterization~~ samples for the generator/storage sites to have established, documented QA/QC programs. The Permittees annually evaluate these laboratories and their QA/QC programs as part of their participation in the Permittees' ~~Performance Demonstration Program (~~PDP~~)~~ laboratory performance program. The Permittees' audits cover the requirements of the lab's QA/QC program, as well as compliance with this WAP. Continued compliance with these parameters will be verified by ongoing audits by the Permittees at the generator/storage sites and these laboratories as specified in Permit Attachment B6. The Permittees' audits of the generator/storage sites will verify that the laboratories analyzing the sites' waste have been properly audited by the generator/storage sites. The laboratory's QA/QC program shall include the following:

- Facility organization
- A list of equipment/instrumentation
- Operating procedures
- Laboratory QA/QC procedures
- Quality assurance review

- Laboratory records management

B-4a(5) Data Verification

~~Batch Data Reports~~ BDRs will document the testing, sampling, and analytical results from the required characterization activities, and document required QA/QC activities. Data validation and verification at both the data-generation level and the project level will be performed as required by this Permit before the required data are transmitted to the Permittees (Permit Attachment B3). NMED may request, through the Permittees, copies of any ~~Batch Data Report~~ BDR, and/or the raw data validated by the generator/storage sites, to check the Permittees' audit of the validation process.

B-4a(6) Data Transmittal

~~Batch Data Reports~~ BDRs will include the information required by Section B3-10 and will be transmitted by hard copy or electronically (provided a hard copy is available on demand) from the data generation level to the project level.

The generator/storage site will transmit waste container information electronically via the WIPP Waste Information System (**WWIS**). Data will be entered into the WWIS in the exact format required by the database. Refer to Section B-~~4b~~5a(1) for WWIS reporting requirements and the *WIPP Waste Information System User's Manual for Use by Shippers/Generators* (DOE, 2001) for the WWIS data fields and format requirements.

Once a waste stream is fully characterized, the Site Project Manager will also submit to the Permittees a WSPF (Figure B-1) accompanied by the ~~Characterization Information Summary~~ CIS for that waste stream which includes reconciliation with DQOs (Section B3-12b(1)). The WSPF, the ~~Characterization Information Summary~~ CIS, and information from the WWIS will be used as the basis for acceptance of waste characterization information on TRU mixed wastes to be disposed of at the WIPP.

B-4a(7) Records Management

Records related to waste characterization activities ~~at~~ performed by the generator/storage sites will be maintained in the testing, sampling, or analytical facility files or generator/storage site project files. ~~Contract~~ Permittee approved laboratories will forward testing, sampling, and analytical records along with ~~Batch Data Reports~~ 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 for permanent archival 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 and then dispositioned according to their approved RIDS. If a generator/storage site ceases to operate, all records shall be transferred before closeout. Table B-~~7~~6 is~~ provides~~ 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.

~~At the Permittee Level, 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 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.~~

B-~~4b~~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~~ transporting the~~ configuring shipments of TRU mixed waste~~ to the WIPP facility~~. Phase II will occur after~~ the~~ configuration of shipments of TRU mixed waste~~ shipment arrives but~~ before it is~~ emplaced~~ placed into storage or disposed at the WIPP facility. Figure B-~~5~~3 presents Phase I of the TRU mixed waste~~ shipment~~ screening process. Permit Attachment B7 presents Phase II, which are the Permittees TRU mixed waste confirmation processes.

B-~~4b(1)~~5a Phase I Waste Stream Screening and Verification

The first phase of the waste screening and verification process will occur before TRU mixed waste is shipped to the WIPP facility. Before the Permittees begin the process of accepting TRU mixed waste from a generator/storage site, an initial audit of that generator/storage site will be conducted as part of the Permittees' Audit and Surveillance Program (Permit Attachment B6). The RCRA portion of the generator/storage site audit program will provide on-site verification of characterization procedures;~~ Batch Data Report~~ BDR preparation; and recordkeeping to ensure that all applicable provisions of the WAP requirements are met. Another portion of the Phase I verification is the WSPF approval process. At the WIPP facility, this process includes verification that all of the required elements of the WSPF and the~~ Characterization Information Summary~~ CIS are present (Permit Attachment B3) and that the waste characterization information meet acceptance criteria required for compliance with the WAP (Section B3-12b(1)).

~~Once a~~ A generator/storage site ~~has~~ must first prepare~~d~~ a QAPjP, which includes applicable WAP requirements, ~~it is~~ and submit~~ted~~ it to the Permittees for review and approval (Permit Attachment B5). Once approved, a copy of the QAPjP is provided to NMED for examination. The generator/storage site will implement the specific parameters of the QAPjP after it is approved. ~~The~~ An initial ~~generator/storage site RCRA~~ audit will be performed ~~at some point~~ after ~~this~~ QAPjP implementation ~~has taken place, but~~ and prior to ~~shipment of TRU mixed waste from that~~ the generator/storage site being certified for shipment of waste to WIPP. Additional audits, focusing on the results of waste characterization, will be performed at least annually. The Permittees have the right to conduct unannounced audits and to examine any records that are related to the scope of the audit. See Section B-5a(3) and Permit Attachment B6 for further information regarding audits.

When the required waste stream characterization data have been collected by a generator/storage site and the initial generator/storage site audit has been successfully completed, the generator/storage Site Project Manager will verify that waste stream characterization meets the applicable WAP requirements as a part of the project level verification (Section B3-10b). If the waste characterization does not meet the applicable requirements of the WAP, the mixed waste stream cannot be managed, stored, or disposed at WIPP until those requirements are met. The Site Project Manager will then complete a WSPF and submit it to the Permittees, along with the accompanying ~~Characterization Information Summary~~ CIS for that waste stream (Section B3-12b(1)). All data necessary to check the accuracy of the WSPF will be transmitted to the Permittees for verification. This provides notification that the generator/storage site considers that the waste stream (identified by the waste stream identification number) has been adequately characterized for disposal prior to shipment to WIPP. The Permittees will compare headspace gas, radiographic, visual examination and solid sampling/analysis data obtained subsequent to submittal and approval of the WSPF (and prior to submittal) with characterization information presented on this form. If the Permittees determine (through the data comparison) that the characterization information is adequate, the WSPF will be approved. Prior to the first shipment of containers from the approved waste stream, the approved WSPF and accompanying ~~Characterization Information Summary~~ CIS will be provided to NMED. If the data comparison indicates that analyzed containers have hazardous wastes not present on the WSPF, or a different Waste Matrix Code applies, the WSPF is in error and shall be resubmitted. Ongoing WSPF examination is discussed in detail in Section B-~~4b(1)(ii)~~5a(2).

Audits of generator/storage sites will be conducted as part of the Permittees' Audit and Surveillance Program (Permit Attachment B6). The RCRA portion of the generator/storage site audit program will provide on-site verification of waste characterization procedures; BDR preparation; and record keeping to ensure that all applicable provisions of the WAP requirements are met. As part of the waste characterization data submittal, the generator/storage site will also transmit the data on a container basis via the WWIS. This data submittal can occur at any time as the data are being collected, but will be complete for each container prior to shipment of that container. The WWIS will conduct internal edit/limit checks as the data are entered, and the data will be available to the Permittees ~~for review~~ as supporting information for WSPF review. NMED will have read-only access to the WWIS as necessary to determine compliance with the WAP. The initial WSPF check performed by the Permittees will include WWIS data submitted by the generator/storage site for each waste container and the ~~Characterization Information Summary~~ CIS. The Permittees will compare ongoing sampling/analysis characterization data obtained and submitted via the WWIS to the approved WSPF. If this comparison shows that containers have hazardous wastes not reported on the WSPF, or a different Waste Matrix Code applies, the data are rejected and the waste containers are not accepted for shipment until a new or revised WSPF is submitted to and approved by the Permittees.

If discrepancies regarding hazardous waste number assignment or Waste Matrix Code designation arise as a result of the Phase I review, the generator/storage sites will be contacted by the Permittees and required to provide the necessary additional information to resolve the discrepancy before that waste stream is approved for disposal at the WIPP facility. If the discrepancy is not resolved, the waste stream will not be approved. The Permittees will notify NMED in writing of any discrepancies identified during WSPF review and the resulting discrepancy resolution prior to waste shipment. The Permittees will not manage, store, or dispose the waste stream until this discrepancy is resolved in accordance with this WAP.

If discrepancies regarding hazardous waste number assignment or Waste Matrix Code designation arise as a result of the Phase I review, the generator/storage sites will be contacted by the Permittees and required to provide the necessary additional information to resolve the discrepancy before that waste stream is approved for disposal at the WIPP facility. If the discrepancy is not resolved, the waste stream will not be approved.

B-~~4b(1)(i)~~5a(1) WWIS Description

All generator/storage sites planning to ship TRU mixed waste to WIPP will supply the required data to the WWIS. The WWIS Data Dictionary includes all of the data fields, the field format and the limits associated with the data as established by this WAP. These data will be subjected to edit and limit checks that are performed automatically by the database, as defined in the *WIPP Waste Information System User's Manual for Use by Shippers/Generators* (DOE, 2001).

The Permittees will coordinate the data transmission with each generator/storage site. Actual data transmission will use appropriate technology to ensure the integrity of the data transmissions. The Permittees will require sites with large waste inventories and large databases to populate a data structure provided by the Permittees that contains the required data dictionary fields that are appropriate for the waste stream (or waste streams) at that site. For example, totals analysis data will not be requested from sites that do not have homogeneous solids or soil/gravel waste. The Permittees will access these data via the Internet to ensure an efficient transfer of this data. Small quantity sites will be given a similar data structure by the Permittees that is tailored to their types of waste. Sites with very small quantities of waste will be provided with the ability to assemble the data interactively to this data structure on the WWIS.

The Permittees will use the WWIS to verify that all of the supplied data meet the edit and limit checks prior to the shipment of any TRU mixed waste to WIPP. The WWIS automatically will notify the generator/storage site if any of the supplied data fails to meet the requirements of the edit and limit checks via an appropriate error message. The generator/storage site will be required to correct the discrepancy with the waste or the waste data and re-transmit the corrected data prior to acceptance of the data by the WWIS. The Permittees will review data reported for each container of each shipment prior to providing notification to the shipping generator/storage site that the shipment is acceptable. Read-only access to the WWIS will be provided to ~~the~~ NMED. Table B-~~8~~7 contains a listing of the data fields contained in the WWIS that are required as part of this Permit.

The WWIS will generate the following:

- Waste Emplacement Report

  This report will be added to the operating record to track the quantities of waste, date of emplacement, and location of authorized containers or container assemblies in the repository. The Permittees will document the specific panel room or drift that an individual waste container is placed in as well as the row/column/height coordinates location of the container or containers assembly. This report will be generated on a weekly basis. Locations of containers or container assemblies will also be placed on a map separate from the WWIS. Reports and maps that are included as part of the operating record will be retained at the WIPP site, for the life of the facility.

- Shipment Summary Report

  This report will contain the container identification numbers (**IDs**) of every container in the shipment, listed by ~~Contact Handled~~ Shipping Package number and by assembly number (for seven-packs, four-packs, and three-packs), for every assembly in the ~~Contact Handled~~ Shipping Package. This report is used by the Permittees to verify containers in a shipment and will be generated on a shipment basis.

- Waste Container Data Report

  This report will be generated on a waste stream basis and will be used by the Permittees during the WSPF review and approval process. This report will contain the data listed in the Characterization Module on Table B-~~8~~7. This report will be generated and attached to the WSPF for inclusion in the facility operating record and will be kept for the life of the facility.

- Reports of Change Log

  This will consist of a short report that lists the user ID and the fields changed. The report will also include a reason for the change. A longer report will list the information provided on the short report and include a before and after image of the record for each change, a before-record for each deletion, and the new information for added records. These reports will provide an auditable trail for the data in the database.

~~The WWIS shall have data available for export so that the Permittees and NMED can summarize headspace gas concentrations for the open room being loaded. This is required to allow calculations of average room headspace gas concentrations to ensure they do not exceed the limits specified in Table B-2.~~

Access to the WWIS will be controlled by the Permittees' Data Administrator (**DA**) who will control the WWIS users based on approval from management personnel.

The TRU mixed waste generator/storage sites will only have access to data that they have supplied, and only until the data have been formally accepted by the Permittees. After the data have been accepted, the data will be protected from indiscriminate change and can only be changed by a authorized DA.

The WWIS has a Change Log that requires a reason for the change from the DA prior to accepting the change. The data change information, the user ID of the authorized DA making the change, and the date of the change will be recorded in the data change log automatically. The data change log cannot be revised by any user, including the DA. The data change log will be subject to internal and external audits and will provide an auditable trail for all changes made to previously approved data.

B-~~4b(1)(ii)~~5a(2) Examination of the Waste Stream Profile Form and Container Data Checks

The Permittees will be responsible for the verification of completeness and accuracy of the Waste Stream Profile Form (Section B3-12b(1)). Figure B-2 includes the waste characterization and Permittees' waste stream approval process. The assignment of the waste stream description, Waste Matrix Code Group, and Summary Category Groups; the results of waste analyses, as applicable; the acceptable knowledge summary documentation; the methods used for characterization; the Carlsbad Field Office (**CBFO**) certification, and appropriate designation of EPA hazardous waste ~~code~~ number(s) will be examined. If the WSPF is inaccurate, efforts will be made to resolve discrepancies by contacting the generator/storage site in order for the waste stream to be eligible for shipment to the WIPP facility. If discrepancies in the waste stream are detected at the generator/storage site, the generator/storage site will implement a non-conformance program to identify, document, and report discrepancies (Permit Attachment B3).

The WSPF shall pass all verification checks by the Permittees in order for the waste stream to be approved for shipment to the WIPP facility. The WSPF check against waste container data will occur during the initial WSPF approval process (Section B-~~4b(1)~~5a).

The EPA hazardous waste ~~codes~~ numbers for the wastes that appear on the Waste Stream Profile Form will be compared to those in Table B-~~10~~9 to ensure that only approved wastes ~~that contain constituents listed Section XIV~~ are ~~approved~~ accepted for management, storage, or disposal at WIPP. Some of the waste may also be identified by unique state hazardous waste codes or numbers. These wastes are acceptable at WIPP as long as the TSDF-WAC are met. The ~~Characterization Information Summary~~ CIS will be reviewed by the Permittees to verify that the waste has been classified correctly with respect to the assigned EPA hazardous waste ~~codes~~ numbers. ~~The~~ Any analytical method used will be compared to those listed in Tables B-~~3~~2, B-~~4~~3, and B-~~5~~4 to assure ensure that only approved analytical methods were used for analysis of the waste. The Permittees will verify that TSDF-WAC compliance has been met by the generator/storage site.

The EPA hazardous waste numbers for the wastes that appear on the Waste Stream Profile Form will be compared to those in the WIPP Hazardous Waste Permit Application Part A, Permit Attachment O, to ensure that only approved wastes are accepted for storage or disposal at WIPP. Some of the waste may also be identified by unique state hazardous waste numbers. These wastes are acceptable at WIPP as long as the TSDF-WAC are met. The CIS will be reviewed by the Permittees to verify that the waste has been classified correctly with respect to the assigned EPA hazardous waste numbers. The Permittees will verify that TSDF-WAC compliance has been met by the generator/storage site.

Waste data transferred via the WWIS after WSPF approval will be compared with the approved WSPF. Any container ~~with a~~ from an approved hazardous waste stream with a description different from its WSPF will not be managed, stored, or disposed at WIPP.

The Permittees will also verify that three different types of data specified below are available for every container holding TRU mixed waste before that waste is managed, stored, or disposed at WIPP~~. The following three verifications will be performed on data from the following determinations~~: 1) an assignment of the waste stream's waste description (by Waste Matrix Codes) and Waste Matrix Code Group; 2) a determination of ignitability, reactivity, and corrosivity; and 3) a determination of compatibility. The verification of waste stream description will be performed by reviewing the WWIS for consistency in the waste stream description and WSPF. The ~~Characterization Information Summary~~ CIS will indicate if the waste has been checked for the characteristics of ignitability, corrosivity, and reactivity. The final verification of waste compatibility will be performed using Appendix C1 of the WIPP RCRA Part B Permit Application (DOE, 1997), the compatibility study.

Any container with unresolved discrepancies associated with hazardous waste characterization will not be managed, stored, or disposed at the WIPP facility until the discrepancies are resolved. All shipments of the subject waste stream will cease until the corrective action(s), as necessary, have been implemented and the discrepancy resolved. The Permittees will notify NMED when the certification status of a waste stream at a generator/storage site is revoked. Waste characterization and certification authority will not be reinstated until the generator/storage site demonstrates all corrective actions have been implemented and the program is reassessed by the Permittees.

B-~~4b(1)(iii)~~5a(3) Permittees' Audit and Surveillance Program

An important part of the Permittees' verification process is the Permittees' Audit and Surveillance Program. The focus of this audit program is compliance with this WAP and the Permit. This audit program addresses all AK implementation and waste sampling and analysis activities, from waste stream classification assignment through ~~final loading of the Contact Handled Package~~ waste container certification, and ensures compliance with SOPs and the WAP. Audits will ~~assure~~ ensure that containers and their associated documentation are adequately tracked throughout the waste handling process. Operator qualifications will be verified, and implementation of QA/QC procedures will be surveyed. A final report that includes generator/storage site or Permittee approved laboratory audit results and applicable WAP-related corrective action report (**CAR**) resolution will be provided to NMED for approval, and will be kept in the WIPP facility operating record until closure of the WIPP facility.

An initial audit will be performed at each generator/storage site performing waste characterization activities prior to the formal acceptance of the WSPFs and/or any waste characterization data supplied by the generator/storage sites. Audits will be performed at least annually thereafter, including the possibility of unannounced audits (i.e., not a regularly scheduled audit). These audits will allow NMED to verify that the Permittees have implemented the WAP and that generator/storage sites have implemented a QA program for the characterization of waste and meet applicable WAP requirements. The Permittees will also audit annually the Permittee approved laboratories performing waste sampling and/or analysis. The accuracy of physical waste description and waste stream assignment provided by the generator/storage site will be verified by review of the radiography results, and visual examination of data records and radiography images (as necessary) during audits conducted by the Permittees. More detail on this audit process is provided in Permit Attachment B6.

B-~~4b(2)~~5b Phase II Waste Shipment Screening and Verification

Phase II of the waste shipment screening and verification process includes examination of a waste shipment after the waste shipment has arrived. The Phase II, the Permittees will determin~~ations ar~~e: 1) ~~a determination of~~ the completeness and accuracy of the EPA Hazardous Waste Manifest; 2) ~~a determination of~~ waste shipment completeness and container defects; 3) ~~a determination of~~ land disposal restriction notice completeness; and 4) ~~an identification and resolution of~~ waste shipment irregularities. In addition, as part of Phase II activities, the Permittees will perform waste confirmation activities specified in Attachment B7. Only those waste containers that pass all Phase II waste screening determinations will be emplaced at WIPP. For each container shipped, the Permittees shall ensure that the generator/storage sites provide the following information:

Hazardous Waste Manifest Information:

- Generator/storage site name and EPA ID
- Generator/storage site contact name and phone number
- Quantity of waste
- List of the hazardous waste ~~codes~~ numbers in the shipment
- Listing of all shipping container IDs (~~Contact Handled~~ Shipping Package serial number)
- Signature of authorized generator representative

Specific Waste Container information:

- Waste Stream Identification Number
- List of Hazardous ~~Codes~~ Hazardous Waste Numbers per Container
- Certification Data
- Shipping Data (Assembly numbers, ship date, shipping category, etc.)

This information shall also be supplied electronically to the WWIS. The container-specific information will be supplied electronically as ~~part of the Level 3 Phase I Screening~~ described in Section B-5a(1), and shall be supplied prior to the Permittees' management, storage, or disposal of the waste.

The Permittees will verify each approved shipment upon receipt at WIPP against the data on the WWIS shipment summary report to ensure containers have the required information. A Waste Receipt Checklist will be used to document the verification.

B-~~4b(2)(I)~~5b(1) Examination of the EPA Uniform Hazardous Waste Manifest and Associated Waste Tracking Information

Upon receipt of a TRU mixed waste shipment, the Permittees will make a determination of EPA Uniform Hazardous Waste Manifest completeness and sign the manifest to allow the driver to depart. The Permittees will then make a determination of waste shipment completeness by checking the unique, bar-coded identification number found on each container holding TRU mixed waste against the WWIS database after opening the ~~Contact Handled~~ Shipping Package.

The WWIS links the bar-coded identification numbers of all containers in a specific waste shipment to the waste assembly (for 7-packs, 4-packs, and 3-packs) and to the shipment identification number, which is also written on the EPA Hazardous Waste Manifest. For shipments in the RH-TRU 72B cask, only one payload container is bar-coded. For shipments in the CNS 10-160B cask, the WWIS links the bar-coded identification numbers of all containers in a specific waste shipment to the shipment identification number, which is also written on the EPA hazardous waste manifest. Generators electronically transmit the waste shipment information to the WWIS before the TRU mixed waste shipment is transported. Once a TRU mixed waste shipment arrives, the Permittees verify the identity of each cask or container (or one container in a bound 7-pack, 4-pack, or 3-pack) using the data already in the WWIS.

The WWIS will maintain waste container receipt and emplacement information provided by the Permittees. It will include, among other items, the following information associated with each container of TRU mixed waste:

- ~~Contact Handled~~ Package inner containment vessel or shipping cask closure date
- Package (container or canister) receipt date
- Overpack identification number (if appropriate)
- Package (container or canister) emplacement date
- Package (container or canister) emplacement location

The WWIS links the bar-coded identification numbers of all containers in a specific TRU mixed waste shipment to the waste assembly (for 7-packs, 4-packs, and 3-packs) and to the shipment identification number, which is also written on the EPA Hazardous Waste Manifest. Generators electronically transmit the waste shipment information to the WWIS before the TRU mixed waste shipment is transported. Once a TRU mixed waste shipment arrives, the Permittees verify the identity of each container (or one container in a bound 7-pack, 4-pack, or 3-pack) using the data already in the WWIS.

~~Discrepancies~~ Manifest discrepancies will be identified during manifest examination and container bar-code WWIS data comparison. A manifest discrepancy is a difference between the quantity or type of hazardous waste designated on the manifest and the quantity or type of hazardous waste the WIPP facility actually receives. The generator/storage site technical contact (as listed on the manifest) will be contacted to resolve the discrepancy. If the discrepancy is identified prior to the containers being removed from the ~~Contact Handled Package~~ package or shipping cask, the waste will be retained in the parking area. If the discrepancy is identified after the waste containers are removed from the ~~Contact Handled Package~~ package or cask, the waste will be retained in the Waste Handling Building (**WHB**) until the discrepancy is resolved. Errors on the manifest can be corrected by the WIPP facility with a verbal (followed by a mandatory written) concurrence by the generator/storage site technical contact. All discrepancies that are unresolved within fifteen (15) days of receiving the waste will be immediately reported to ~~the~~ NMED in writing. Notifications to ~~the~~ NMED will consist of a letter describing the discrepancies, discrepancy resolution, and a copy of the manifest. If the manifest discrepancies have not been resolved within thirty (30) days of waste receipt, the shipment will be returned to the generator/storage facility. If it becomes necessary to return waste containers to the generator/storage site, a new EPA Uniform Hazardous Waste Manifest may be prepared by the Permittees.

Documentation of the returned containers will be recorded in the WWIS. Changes will be made to the WWIS data to indicate the current status of the container(s) The reason for the WWIS data change and the record of the WWIS data change will be maintained in the change log of the WWIS, which will provide an auditable record of the returned shipment.

The Permittees will be responsible for the resolution of discrepancies, notification of ~~the~~ NMED, as well as returning the original copy of the manifest to the generator/storage site.

B-~~4b(2)(ii)~~5b(2) Examination of the Land Disposal Restriction (**LDR**) Notice

TRU mixed waste designated by the Secretary of Energy for disposal at WIPP is exempt from the LDRs by the WIPP Land Withdrawal Act Amendment (Public Law 104-201). This amendment states that WIPP "Waste is exempted from treatment standards promulgated pursuant to section 3004(m) of the Solid Waste Disposal Act (42 U.S. C. 6924(m)) and shall not be subjected to the Land Disposal prohibitions in section 3004(d), (e), (f), and (g) of the Solid Waste Disposal Act." Therefore, with the initial shipment of a TRU mixed waste stream, the generator shall provide the Permittees with a one time written notice. The notice must include the information listed below:

Land Disposal Restriction Notice Information:

- EPA Hazardous Waste Number(s) and Manifest Numbers of first shipment of a mixed waste stream
- Statement: this waste is not prohibited from land disposal
- Date the waste is subject to prohibition

This information is the applicable information taken from column "268.7(a)(4)" of the "Generator Paperwork Requirements Table" in 20.4.1.800 NMAC (incorporating 40 CFR §268.7(a)(4)). Note that item "5" from the "Generator Paperwork Requirements Table" is not applicable since waste analysis data are provided electronically via the WWIS and item "7" is not applicable since ~~WIPP~~ waste designated by the Secretary of Energy for disposal at WIPP is exempted from the treatment standards.

The Permittees will review the LDR notice for accuracy and completeness. The generator will prepare this notice in accordance with the applicable requirements of 20.4.1.800 NMAC (incorporating 40 CFR §268.7(a)(4)).

B-~~4b(2)(iii)~~5b(3) Verification

The Permittees will make a determination of TRU mixed waste shipment irregularities. The following items will be inspected for each TRU mixed waste shipment arriving at the WIPP facility:

- Whether the number and type of containers holding TRU mixed waste match the information in the WWIS

- Whether there are any container defects

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-~~8~~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 at an off-site facility as specified in Permit Attachment B7, the containers will be approved for storage and disposal at the WIPP facility.

B-~~4b(2)(iv)~~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-~~4b(2)(v)~~7 Records Management and Reporting

As part of the WIPP facility's operating record, data and documents associated with waste characterization and waste confirmation ~~data~~ 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 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.

The storage of the Permittees' copy of the manifest, LDR information, waste characterization data, WSPFs, waste confirmation activities, and other related records will be identified on the appropriate records inventory and disposition schedule.

Waste characterization and waste confirmation data and documents related to waste characterization that are part of the WIPP facility operating record are managed in accordance with the following guidelines:

B-~~4b(2)(vi)~~7a General Requirements

- Records shall be legible
- Corrections shall be made with a single line through the incorrect information, and the date and initial of the person making the correction shall be added
- Black ink is encouraged, unless a copy test has been conducted to ensure the other color ink will copy
- Use of highlighters on records is discouraged
- Records shall be reviewed for completeness
- Records shall be validated by the cognizant manager or designee

B-~~4b(2)(vii)~~7b Records Storage

- Active records shall be stored when not in use
- Quality records shall be kept in a one-hour (certified) fire-rated container or a copy of a record shall be stored separately (sufficiently remote from the original) in order to prevent destruction of both copies as a result of a single event such as fire or natural disaster
- Unauthorized access to the records is controlled by locking the storage container or controlling personnel access to the storage area

The following records will be maintained for waste characterization and waste confirmation purposes as part of the WIPP facility operating record:

- Completed WIPP WSPFs and accompanying ~~Characterization Information Summary~~ CIS, including individual container data as transferred on the WWIS (or received as hard-copy) and any discrepancy-related documentation as specified in Section B-~~4b(1)~~5a

- Radiography and visual examination records (data sheets, packaging logs, and video and audio recordings) of waste confirmation activities

- Completed Waste Receipt Checklists and discrepancy-related documentation as specified in Section B-~~4b(2)~~5b

- WIPP WWIS Waste Emplacement Report as specified in Section B-~~4b(1)(I)~~5a(1)

- Audit reports and corrective action reports from the Permittees' Audit and Surveillance Program audits as specified in Section B-~~4b(1)(iii)~~5a(3) and Permit Attachment B6

- CARs and closure information for corrective actions taken due to nonconforming waste being identified during waste confirmation by the Permittees

These records will be maintained for ~~each~~ all TRU mixed waste ~~container~~ managed at the WIPP facility.

B-~~4b(2)(viii)~~8 Reporting

The Permittees will provide a biennial report in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.75) to NMED that includes information on actual volume and waste descriptions received for disposal during the time period covered by the report.

B-~~5~~9 List of References

U.S. Department of Energy (DOE), 2001, "WIPP Waste Information System User's Manual for Use by Shippers/Generators", DOE/CAO 97-2273, U.S. Department of Energy.

U.S. Department of Energy (DOE), 1997, Resource Conservation and Recovery Act Part B Permit Application for the Waste Isolation Pilot Plant", Revision 6.5, U.S. Department of Energy.

U.S. Department of Energy (DOE), ~~1995c~~ 2003, "Performance Demonstration Program Plan for the Analysis of Simulated Headspace Gases for the TRU Waste Characterization Program," CAO-95-1076, Current Revision, Carlsbad, New Mexico, Carlsbad Field Office, U.S. Department of Energy.

U.S. Department of Energy (DOE), ~~1995d~~ 2005, "Performance Demonstration Program Plans for Analysis of Solid Waste Forms," CAO-95-1077, Current Revision, Carlsbad, New Mexico, Carlsbad Field Office, U.S. Department of Energy.

U.S. Environmental Protection Agency (EPA), April 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, a Guidance Manual," OSWER 9938.4-03, Office of Solid Waste and Emergency Response, Washington, D.C.

U.S. Environmental Protection Agency (EPA), April 1980. "A Method for Determining the Compatibility of Hazardous Wastes," EPA-600/2-80-076, California Department of Health Services and the U.S. Environmental Protection Agency, Office of Research and Development.

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

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TABLES

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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

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

Parameter	Techniques and Procedure
Total Volatile Organic Compounds Acetone, Benzene, Bromoform, Butanol, Carbon disulfide, Carbon tetrachloride, Chlorobenzene, Chloroform, 1,4-Dichlorobenzene[d], 1,2-Dichlorobenzene[d], 1,2-Dichloroethane, 1,1-Dichloroethylene, Ethyl benzene, Ethyl ether, Formaldehyde[b], Hydrazine[c], Isobutanol, Methanol, Methyl ethyl ketone, Methylene chloride, Pyridine[d], 1,1,2,2-Tetrachloroethane, Tetrachloroethylene, Toluene, 1,1,2-Trichloro-1,2,2-trifluoroethane, Trichlorofluoromethane, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl chloride, Xylenes, (trans)-1,2-Dichloroethylene	**Total Volatile Organic Compound Analysis** [g] TCLP, SW-846 1311 GC/MS, SW-846 8260 or 8240 GC/FID, SW-846 8015 (Permit Attachment B3) Acceptable Knowledge for Summary Category S5000 (Debris Wastes)
Total Semivolatile Organic Compounds Cresols, 1,4-Dichlorobenzene[e], 1,2-Dichlorobenzene[e], 2,4-Dinitrophenol, 2,4-Dinitrotoluene, Hexachlorobenzene, Hexachloroethane, Nitrobenzene, Pentachlorophenol, Pyridine[e]	**Total Semivolatile Organic Compound Analysis** [g] TCLP, SW-846 1311 GC/MS, SW-846 8250 or 8270 (Permit Attachment B3) Acceptable Knowledge for Summary Category S5000 (Debris Wastes)
Total Metals Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc	**Total Metals Analysis** [g] TCLP, SW-846 1311 ICP- MS, SW-846 6020 , ICP Emission Spectroscopy, SW-846 6010 Atomic Absorption Spectroscopy , SW-846 7000 (Permit Attachment B3) Acceptable Knowledge for Summary Category S5000 (Debris Wastes)

[a] Permit Attachment B
[b] Required only for homogeneous solids and soil/gravel waste from Savannah River Site to resolve the assignment of EPA hazardous waste numbers.
[c] Required only for homogeneous solids and soil/gravel waste from Oak Ridge National Laboratory and Savannah River Site to resolve the assignment of EPA hazardous waste numbers.
[d] Can also be analyzed as a semi-volatile organic compound.
[e] Can also be analyzed as a volatile organic compound.
[f] Required only to resolve the assignment of EPA hazardous waste numbers to debris waste streams.
[g] Required only to resolve the assignment of EPA hazardous waste numbers to homogeneous solid and soil/gravel waste streams.

~~TABLE B-2~~
~~MAXIMUM ALLOWABLE VOC ROOM-AVERAGED HEADSPACE CONCENTRATION LIMITS (PPMV)~~

~~COMPOUND~~	~~VOC HEADSPACE CONCENTRATION LIMITS[a] (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~~

~~[a] There are no headspace limits for other VOCs.~~

TABLE B-~~3~~2
HEADSPACE TARGET ANALYTE LIST AND METHODS [b]

Parameter	EPA Specified Analytical Method
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	EPA: Modified TO-14[a]; Modified 8240/8260 EPA - Approved FTIRS
Acetone Butanol Methanol Methyl ethyl ketone Methyl isobutyl ketone	EPA: Modified TO-14[a]; Modified 8240/8260 Method 8015 EPA - Approved FTIRS

[a] U.S. Environmental Protection Agency (EPA), 1988, "Compendium Method TO-14, the Determination of Volatile Organic Compounds (VOC) in Ambient Air Using SUMMA® Passivated Canister Sampling and Gas Chromatographic Analysis," in Compendium of Methods for the Determination of Toxic Organic Compounds on Ambient Air. Research Triangle Park, North Carolina, Quality Assurance Division, Monitoring System Laboratory, U.S. EPA. The most current revision of the specified methods may be used.

~~[b] Required only for containers of homogeneous solids and soil/gravel waste from Savannah River Site.~~

~~[c] Required only for containers of homogeneous solids and soil/gravel waste from Oak Ridge National Laboratory and Savannah River Site.~~

[b] Required only for debris waste when required to resolve the assignment of EPA hazardous waste numbers.

TABLE B-~~4~~3
REQUIRED ORGANIC ANALYSES AND TEST METHODS ORGANIZED BY ORGANIC ANALYTICAL GROUPS [e]

Organic Analytical Group	Required Organic Analyses	EPA Specified Analytical Method [a,d]
Nonhalogenated Volatile Organic Compounds (VOCs)	Acetone Benzene n-Butanol Carbon disulfide Ethyl benzene Ethyl ether Formaldehyde Hydrazine[b] Isobutanol Methanol Methyl ethyl ketone Toluene Xylenes	8015 8240 8260
Halogenated VOCs	Bromoform Carbon tetrachloride Chlorobenzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethylene (trans)-1,2-Dichloroethylene Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene 1,1,2-Trichloroethane 1,1,1-Trichloroethane Trichloroethylene Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Vinyl Chloride	8015 8240 8260
Semivolatile Organic Compounds (SVOCs)	Cresols (o, m, p) 1,2-Dichlorobenzene[c] 1,4-Dichlorobenzene[c] 2,4-Dinitrophenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine[c]	8250 8270

TABLE B-~~4~~3 (CONTINUED)
REQUIRED ORGANIC ANALYSES AND TEST METHODS ORGANIZED BY ORGANIC ANALYTICAL GROUPS

[a] U.S. Environmental Protection Agency (EPA), 1996, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, Third Edition.
[b] Generator/Storage Sites will have to develop an analytical method for hydrazine. This method will be submitted to the Permittees for approval.
[c] These compounds may also be analyzed as VOCs by SW-846 Methods 8240 and 8260.
[d] TCLP (SW-846 1311) may be used to determine if compounds in 20.4.1.200 NMAC (incorporating 40 CFR §261, Subpart C) exhibit a toxicity characteristic.
[e] Required only to resolve the assignment of EPA hazardous waste numbers.

TABLE B-54
SUMMARY OF SAMPLE PREPARATION AND ANALYTICAL METHODS FOR METALS

Parameters	EPA-Specified Analytical Methods[a,b,c]
Sample Preparation	3051, or equivalent, as appropriate for analytical method
Total Antimony	6010, 6020, 7040, 7041, 7062
Total Arsenic	6010, 6020, 7060, 7061, 7062
Total Barium	6010, 6020, 7080, 7081
Total Beryllium	6010, 6020, 7090, 7091
Total Cadmium	6010, 6020, 7130, 7131
Total Chromium	6010, 6020, 7190, 7191
Total Lead	6010, 6020, 7420, 7421
Total Mercury	7471
Total Nickel	6010, 6020, 7520, 7521
Total Selenium	6010, 7740, 7741, 7742
Total Silver	6010, 6020, 7760, 7761
Total Thallium	6010, 6020, 7840, 7841
Total Vanadium	6010, 7910, 7911
Total Zinc	6010, 6020, 7950, 7951

[a] U.S. Environmental Protection Agency (EPA), 1996. "Test Methods for Evaluating Solid Waste," Laboratory Manual Physical/Chemical Methods, SW-846, 3rd ed., U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
[b] TCLP (SW-846 1311) may be used to determine if compounds in 20.4.1.200 NMAC (incorporating 40 CFR §261, Subpart C) exhibit a toxicity characteristic.
[c] Required only for homogeneous solids and soil/gravel to resolve the assignment of EPA hazardous waste numbers.

TABLE B-~~6~~5
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR ~~CH~~ TRANSURANIC MIXED WASTE (STORED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S3000-Homogeneous Solids S4000-Soil/Gravel	C Solidified inorganics C Salt waste C Solidified organics C Contaminated soil/debris	Physical waste form	~~100%~~ Acceptable knowledge, radiography, and/or visual examination	C ~~Verify~~ Determine waste matrix C Demonstrate compliance with waste acceptance criteria (e.g., no free liquids, no incompatible wastes, no compressed gases)
		~~Headspace gases~~ ~~C Gas volatile organic compounds (VOC)~~	~~100% gas sampling and analysis or statistical sampling[a, b] (see Table B-3)~~	~~C Quantify concentration of flammable VOCs~~ ~~C Determine potential flammability of transuranic (TRU) mixed waste headspace gases~~ ~~C Quantify concentrations of VOC constituents in headspace of containers~~ ~~C Ensure that environmental performance standards are not exceeded~~
		Hazardous constituents ~~C TCLP/total metals~~ ~~C TCLP/total VOCs~~ ~~C TCLP/total semi-VOCs~~ C Listed C Characteristic	Acceptable knowledge or s~~S~~tatistical sampling[a] (see Tables B-~~4~~3 and B-~~5~~4)	C Determine characteristic metals and organics ~~C Determine total quantity of metals, VOCs, and semi-VOCs~~ C Resolve the assignment of EPA hazardous waste numbers

TABLE B-~~6~~5 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE
FOR ~~CH~~ TRANSURANIC MIXED WASTE (STORED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S5000–Debris Waste	C Uncategorized metal (metal waste other than lead/cadmium) C Lead/cadmium waste C Inorganic nonmetal waste C Combustible waste C Graphite waste C Heterogeneous waste C Composite filter waste	Physical waste form	~~100% Radiography~~ ~~Visual examination (statistical sample)[a]~~ ~~or visual examination~~ Acceptable knowledge, radiography, and/or visual examination	C ~~Verify~~ Determine waste matrix C Demonstrate compliance with waste acceptance (e.g., no free liquids, no incompatible wastes, no compressed gases)
		Headspace gases C Gas VOCs	~~100%~~ Statistical gas sampling and analysis~~, statistical sampling or assignment of VOC concentrations~~[a] (see Table B-~~3~~2)	~~C Quantify concentration of flammable VOCs~~ ~~C Determine potential flammability of TRU mixed waste headspace gases~~ ~~C Quantify concentrations of VOC constituents in headspace of containers~~ ~~C Ensure that environmental performance standards are not exceeded~~ ~~C Verify acceptable knowledge~~ C Resolve the assignment of EPA hazardous waste numbers
		Hazardous constituents ~~C TCLP/total metals~~ ~~C TCLP/total VOCs~~ ~~C TCLP/total semi-VOCs~~ C Characteristic	Acceptable knowledge	C Determine characteristic metals and organics ~~C Determine total quantity of metals, VOCs, and semi-VOCs~~

TABLE B-~~6~~5 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR ~~CH~~ TRANSURANIC MIXED WASTE (NEWLY GENERATED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S3000-Homogeneous Solids S4000-Soil/Gravel	C Solidified inorganics C Salt waste C Solidified organics C Contaminated soil/debris	Physical waste form	~~Documentation and verification[b] or radiography. Applies to 100% of containers~~ Acceptable knowledge, radiography, and/or visual examination	C ~~Verify~~ Determine waste matrix C Demonstrate compliance with waste acceptance criteria (e.g., no free liquids, no incompatible wastes, no compressed gases)
		~~Headspace gases~~ ~~C Gas VOCs (VOCs)~~	~~100% gas sampling and analysis or statistical sampling[a, b] (see Table B-3)~~	~~C Quantify concentration of flammable VOCs~~ ~~C Determine potential flammability of TRU mixed waste headspace gases~~ ~~C Quantify concentrations of VOC constituents in headspace of containers~~ ~~C Ensure that environmental performance standards are not exceeded~~
		Hazardous constituents ~~C TCLP/total metals~~ ~~C TCLP/total VOCs~~ ~~C TCLP/total semi-VOCs~~ C Listed C Characteristic	Statistical sampling[a] (see Tables B-~~4~~3 and B-~~5~~4)	C Determine characteristic metals and organics ~~C Determine total quantity of metals, VOCs, and semi-VOCs~~ C Resolve the assignment of EPA hazardous waste numbers

TABLE B-~~6~~5 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE
FOR ~~CH~~ TRANSURANIC MIXED WASTE (NEWLY GENERATED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S5000–Debris Waste	C Uncategorized metal (metal waste other than lead/cadmium) C Lead/cadmium waste C Inorganic nonmetal waste C Combustible waste C Graphite waste C Heterogeneous waste C Composite filter waste	Physical waste form	~~Documentation and verification[b] or radiography.~~ ~~Applies to 100% of containers~~ Acceptable knowledge, radiography, and/or visual examination	C ~~Verify~~ Determine waste matrix C Demonstrate compliance with waste acceptance (e.g., no free liquids, no incompatible wastes, no compressed gases)
		Headspace gases C Gas VOCs	~~100%~~ Statistical gas sampling and analysis~~, statistical sampling or assignment of VOC concentrations~~[a] (see Table B-~~3~~2)	~~C Quantify concentration of flammable VOCs~~ ~~C Determine potential flammability of TRU mixed waste headspace gases~~ ~~C Quantify concentrations of VOC constituents in headspace of containers~~ ~~C Ensure that environmental performance standards are not exceeded~~ ~~C Verify acceptable knowledge~~ C Resolve the assignment of EPA hazardous waste numbers
		Hazardous constituents ~~C TCLP/total metals~~ ~~C TCLP/total VOCs~~ ~~C TCLP/total semi-VOCs~~ C Characteristic	Acceptable knowledge	C Determine characteristic metals and organics C Determine total quantity of metals, VOCs, and semi-VOCs

[a] Applies to ~~certain~~ waste streams that require sampling ~~meet the conditions in Section B-3a(1)~~.
~~[b] Number determined as specified in Permit Attachment B2.~~
~~[c] See discussion in Permit Attachment B4.~~

TABLE B-~~7~~6
REQUIRED PROGRAM RECORDS MAINTAINED IN GENERATOR/STORAGE SITE PROJECT FILES

Lifetime Records • Field sampling data forms • Field and laboratory chain-of-custody forms • Test facility and laboratory batch data reports • Waste Stream Characterization Package • Sampling Plans • Data reduction, validation, and reporting documentation • Acceptable knowledge documentation ~~• Data reconciliation report~~ • Waste Stream Profile Form and Characterization Information Summary
Non-Permanent Records • Nonconformance documentation • Variance documentation • Assessment documentation • Gas canister tags • Methods performance documentation • Performance Demonstration Program documentation • Sampling equipment certifications • Calculations and related software documentation • Training/qualification documentation • QAPjPs (generator/storage sites) documentation (all revisions) • Calibration documentation • Analytical raw data • Procurement documentation • QA procedures (all revisions) • Technical implementing procedures (all revisions) • Audio/video recording (radiography, visual, etc.)

TABLE B-~~8~~7
WIPP WASTE INFORMATION SYSTEM DATA FIELDS[a]

Characterization Module Data Fields [b]	
Container ID [c]	Total VOC Sample Date
Generator EPA ID	Total VOC Analysis Date
Generator Address	Total VOC Analyte Name [d]
Generator Name	Total VOC Analyte Concentration [d]
Generator Contact	Total Metal Sample Date
Hazardous Code	Total Metal Analysis Date
Headspace Gas Sample Date	Total Metal Analyte Name [d]
Headspace Gas Analysis Date	Total Metal Analyte Concentration [d]
Layers of Packaging	Semi-VOC Sample Date
Liner Exists	Semi-VOC Analysis Date
Liner Hole Size	Semi-VOC Analyte Name [d]
Filter Model	Semi-VOC Concentration [d]
Number of Filters Installed	Transporter EPA ID
Headspace Gas Analyte [d]	Transporter Name
Headspace Gas Concentration [d]	Visual Exam Container [e]
Headspace Gas Char. Method [d]	Waste Material Parameter [d]
Total VOC Char. Method [d]	Waste Material Weight [d]
Total Metals Char. Method [d]	Waste Matrix Code
Total Semi-VOC Char. Method [d]	Waste Matrix Code Group
Item Description Code	Waste Stream Profile Number
Haz. Manifest Number	
NDE Complete [e]	
Certification Module Data Fields	
Container ID [c]	Handling Code
Container type	
Container Weight	
Contact Dose Rate	
Container Certification date	
Container Closure Date	
Transportation Data Module	
Contact Handled Package Number	Ship Date
Assembly Number[f]	Receive Date
Container IDs [c,d]	
ICV Closure Date	

TABLE B-~~8~~7
WIPP WASTE INFORMATION SYSTEM DATA FIELDS[a]

Disposal Module Data
Container ID [c] Disposal Date Disposal Location

[a] This is not a complete list of the WWIS data fields.

[b] Some of the fields required for characterization are also required for certification and/or transportation.

[c] Container ID is the main relational field in the WWIS Database.

[d] This is a multiple occurring field for each analyte, nuclide, etc.

[e] These are logical fields requiring only a yes/no.

[f] Required for 7-packs of 55-gal drums, 4-packs of 85-gal drums, or 3-packs of 100-gal drums to tie all of the drums in that assembly together. This facilitates the identification of waste containers in a shipment without need to breakup the assembly.

TABLE B-~~9~~8
WASTE TANKS SUBJECT TO EXCLUSION

Hanford Site - 177 Tanks	
A-101 through A-106	C-201 through C-204
AN-101 through AN-107	S-101 through S-112
AP-101 through AP-108	SX-101 through SX-115
AW-101 through AW-106	SY-101 through SY-103
AX-101 through AX-104	T-101 through T-112
AY-101 through AY-102	T-201 through T-204
B-101 through B-112	TX-101 through TX-118
B-201 through B-204	TY-101 through TY-106
BX-101 through BX-112	U-101 through U-112
BY-101 through BY-112	U-201 through U-204
C-101 through C-112	
Savannah River Site - 51 Tanks	
Tank 1 through 51	
Idaho National Engineering and Environmental Laboratory - 15 Tanks	
WM-103 through WM-106	WM-180 through 190

TABLE B-~~10~~9
LISTING OF PERMITTED HAZARDOUS WASTE NUMBERS

EPA Hazardous Waste Numbers			
F001	D019	D043	U079
F002	D021	P015	U103
F003	D022	P030	U105
F004	D026	P098	U108
F005	D027	P099	U122
F006	D028	P106	U133*
F007	D029	P120	U134*
F009	D030	U002*	U151
D004	D032	U003*	U154*
D005	D033	U019*	U159*
D006	D034	U037	U196
D007	D035	U043	U209
D008	D036	U044	U210
D009	D037	U052	U220
D010	D038	U070	U226
D011	D039	U072	U228
D018	D040	U078	U~~229~~239*

* Acceptance of U-~~coded~~ numbered wastes listed for reactivity, ignitability, or corrosivity characteristics is contingent upon a demonstration that the wastes no longer exhibit the characteristic of reactivity, ignitability, or corrosivity.

FIGURES

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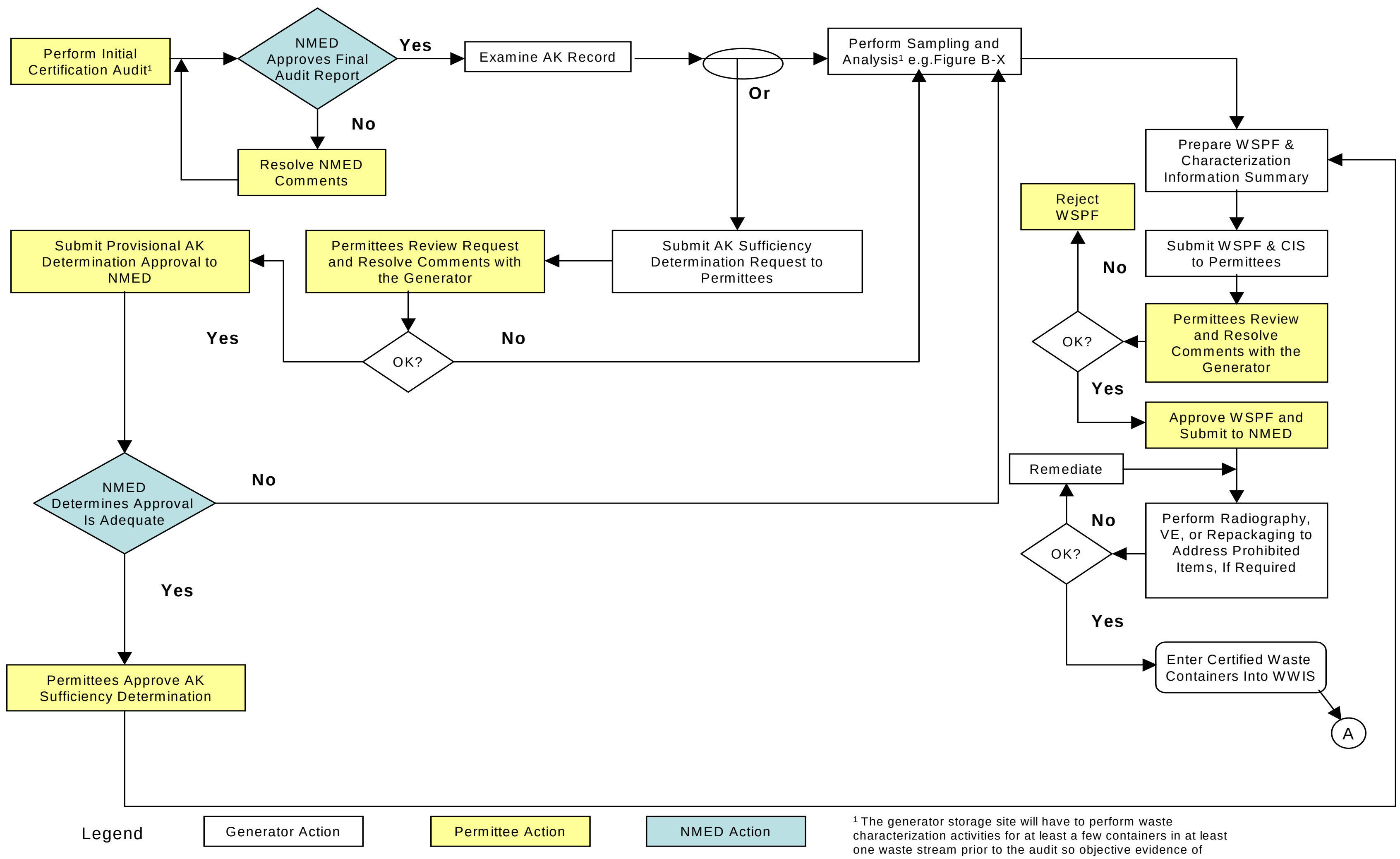
Figure B-1
WIPP Waste Stream Profile Form (Example Only)

Figure B-1
WIPP Waste Stream Profile Form (Example Only - Continued)



[1] The generator storage site will have to perform waste characterization activities for at least a few containers in at least one waste stream prior to the audit so objective evidence of implementation can be generated for review during the audit.

Figure B-2
Waste ~~Data Collection Design for~~ Characterization ~~of Newly Generated Waste~~ Process

~~Figure B-3~~
~~Data Collection Design for Characterization of Retrievably Stored Waste~~

Figure B-~~5~~3
TRU Mixed Waste Screening Flow Diagram

ATTACHMENT B1

WASTE CHARACTERIZATION SAMPLING METHODS

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ATTACHMENT B1

WASTE CHARACTERIZATION SAMPLING METHODS

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ATTACHMENT B1

WASTE CHARACTERIZATION SAMPLING METHODS

Introduction

The Permittees will require generator/storage sites (**sites**) to use the following methods, as applicable, for characterization of TRU mixed waste which is managed, stored, or disposed at WIPP. These methods include requirements for headspace-gas sampling, sampling of homogeneous solids and soil~~s~~/gravel, and radiography or visual examination. Additionally, this Attachment provides quality control, sample custody, and sample packing and shipping requirements.

B1-1 ~~Headspace-Gas Sampling~~ Sampling of Debris Waste (Summary Category S5000)

Headspace gas sampling and analysis shall be used to resolve the assignment of Environmental Protection Agency (**EPA**) hazardous waste numbers to debris waste streams.

B1-1a Method Requirements

The Permittees shall require all headspace-gas sampling be performed in an appropriate radiation containment area on waste containers that are in compliance with the container equilibrium requirements (i.e., 72 hours at 18° C or higher).

~~B1-1a(1) Summary Category S5000 Requirements~~

~~With the exception of qualifying LANL sealed sources waste containers, all waste containers or~~ For those waste streams without an acceptable knowledge (**AK**) Sufficiency Determination approved by the Permittees, containers shall be randomly selected ~~containers~~ from waste streams ~~that meet the conditions for reduced headspace gas sampling listed in Permit Attachment B, Section B-3a(1),~~ designated as summary category S5000 (Debris waste) and shall be categorized under one of the sampling scenarios shown in Table B1-5 and depicted in Figure B1-1. ~~The LANL sealed sources waste containers that meet specified conditions must be assigned VOC concentration values in accordance with Section B-3a(1)(iii).~~ If the container is categorized under Scenario 1, the applicable drum age criteria (**DAC**) from Table B1-6 must be met prior to headspace gas sampling. If the container is categorized under Scenario 2, the applicable Scenario 1 DAC from Table B1-6 must be met prior to venting the container and then the applicable Scenario 2 DAC from Table B1-7 must be met after venting the container. The DAC for Scenario 2 containers that contain filters or rigid liner vent holes other than those listed in Table B1-7 shall be determined using footnotes “a” and “b” in Table B1-7. Containers that have not met the Scenario 1 DAC at the time of venting must be categorized under Scenario 3. Containers categorized under Scenario 3 must be placed into one of the Packaging Configuration Groups listed in Table B1-8. If a specific packaging configuration cannot be determined based on the data collected during packaging and/or repackaging (Attachment B, Section B-3~~(d)~~(1)), a conservative default Packaging Configuration Group of 3 for 55-gallon drums, 6 for Standard Waste Boxes (**SWBs**) and ten-drum overpacks (**TDOPs**), and 8 for 85-

gallon and 100-gallon drums must be assigned, provided the drums do not contain pipe component packaging. If a container is designated as Packaging Configuration Group 4 (i.e., a pipe component), the headspace gas sample must be taken from the pipe component headspace. Drums, TDOPs, or SWBs that contain compacted 55-gallon drums containing a rigid liner may not be disposed of under any packaging configuration unless headspace gas sampling was performed before compaction in accordance with this waste analysis plan (**WAP**). The DAC for Scenario 3 containers that contain rigid liner vent holes that are undocumented during packaging~~ (Attachment B, Section B-3(d)1)~~, repackaging~~ (Attachment B, Section B-3(d)1)~~, and/or venting (Section B1-1a[~~6~~4][ii]) shall be determined using the default conditions in footnote “b” in Table B1-9.The DAC for Scenario 3 containers that contain filters that are either undocumented or are other than those listed in Table B1-9 shall be determined using footnote ‘a’ in Table B1-9. Each of the Scenario 3 containers shall be sampled for headspace gas after waiting the DAC in Table B1-9 based on its packaging configuration (note: Packaging Configuration Groups 4, 5, 6, 7, and 8 are not summary category group dependent, and 85-gallon drum, 100-gallon drum, SWB, and TDOP requirements apply when the 85-gallon drum, 100-gallon drum, SWB, or TDOP is used for the direct loading of waste).

~~B1-1a(2) Summary Category S3000/S4000 Requirements~~

~~All waste containers or randomly selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in Permit Attachment B, Section B-3a(1), designated as summary categories S3000 (Homogeneous solids) and S4000 (Soil/gravel) shall be categorized under one of the sampling scenarios shown in Table B1-5 and depicted in Figure B1-1. If the container is categorized under Scenario 1, the applicable DAC from Table B1-6 must be met prior to headspace gas sampling. If the container is categorized under Scenario 2, the applicable Scenario 1 DAC from Table B1-6 must be met prior to venting the container and then the applicable Scenario 2 DAC from Table B1-7 must be met after venting the container. The DAC for Scenario 2 containers that contain filters or rigid liner vent holes other than those listed in Table B1-7 shall be determined using footnotes “a” and “b” in Table B1-7. Containers that have not met the Scenario 1 DAC at the time of venting must be categorized under Scenario 3. Containers categorized under Scenario 3 must be placed into one of the Packaging Configuration Groups listed in Table B1-8. If a specific packaging configuration cannot be determined based on the data collected during packaging and/or repackaging (Attachment B, Section B-3(d)1), a conservative default Packaging Configuration Group of 3 for 55-gallon drums, 6 for SWBs and TDOPs, and 8 for 85-gallon and 100-gallon drums must be assigned, provided the drums do not contain pipe component packaging. If a container is designated as Packaging Configuration Group 4 (i.e., a pipe component), the headspace gas sample must be taken from the pipe component headspace. Drums, TDOPs, or SWBs that contain compacted 55-gallon drums containing a rigid liner may not be disposed of under any packaging configuration unless headspace gas sampling was performed before compaction in accordance with this WAP.. The DAC for Scenario 3 containers that contain rigid liner vent holes that are undocumented during packaging (Attachment B, Section B-3(d)1), repackaging (Attachment B, Section B-3(d)1), and/or venting (Section B1-1a[6][ii]) shall be determined using the default conditions in footnote “b” in Table B1-10. The DAC for Scenario 3 containers that contain filters that are either undocumented or are other than those listed in Table B1-10 shall be determined using footnote ‘a’ in Table B1-10. Each of the Scenario 3 containers shall be sampled after waiting the DAC in Table B1-10 based on its packaging configuration (note: Packaging Configuration Groups 4, 5, 6, 7, and 8 are not summary category~~

~~group dependent, and 85-gallon drum, 100-gallon drum, SWB, and TDOP requirements apply when the 85-gallon drum, 100-gallon drum, SWB, or TDOP is used for the direct loading of waste).~~

B1-1a(~~3~~1) General Requirements

The determination of packaging configuration consists of identifying the number of confinement layers and the identification of rigid poly liners when present. Generator/storage sites shall use either the default conditions specified in Tables B1-7 through B1-10 for retrievably stored waste or the data documented during packaging ~~(Attachment B, Section B-3(d)1)~~, repackaging ~~(Attachment B, Section B-3(d)1)~~, and/or venting (Section B1-1a[~~6~~4][ii]) for determining the appropriate DAC for each container from which a headspace gas sample is collected. These drum age criteria are to ensure that the container contents have reached 90 percent of steady state concentration within each layer of confinement (Lockheed, 1995; BWXT, 2000). The following information must be reported in the headspace gas sampling documents for each container from which a headspace gas sample is collected:

- sampling scenario from Table B1-5 and associated information from Tables B1-6 and/or Table B1-7;
- the packaging configuration from Table B1-8 and associated information from Tables B1-9 or B1-10, including the diameter of the rigid liner vent hole, the number of inner bags, the number of liner bags, the presence/absence of drum liner, and the filter hydrogen diffusivity,
- the permit-required equilibrium time,
- the drum age,
- for supercompacted waste, both
    - the absence of rigid liners in the compacted 55-gallon drums which have not been headspace gas sampled in accordance with this permit prior to compaction, and
    - the absence of layers of confinement must be documented in the WWIS if Packaging Configuration Group 7 is used.

For all retrievably stored waste containers, the rigid liner vent hole diameter must be assumed to be 0.3 inches unless a different size is documented during drum venting or repackaging. For all retrievably stored waste containers, the filter hydrogen diffusivity must be assumed to be the most restrictive unless container-specific information clearly identifies a filter model and/or diffusivity characteristic that is less restrictive. For all retrievably stored waste containers that have not been repackaged, acceptable knowledge shall not be used to justify any packaging configuration less conservative than the default (i.e., Packaging Configuration Group 3 for 55-gallon drums, 6 for SWBs and TDOPs, and 8 for 85-gallon and 100-gallon drums). For information reporting purposes listed above, sites may report the default packaging configuration for retrievably stored waste without further confirmation.

All waste containers with unvented rigid containers greater than 4 liters (exclusive of rigid poly liners) shall be subject to innermost layer of containment sampling or shall be vented prior to initiating drum age and equilibrium criteria. When sampling the rigid poly liner under Scenario 1, the sampling device must form an airtight seal with the rigid poly liner to ensure that a representative sample is collected (using a sampling needle connected to the sampling head to pierce the rigid poly liner, and that allows for the collection of a representative sample, satisfies this requirement). The configuration of the containment area and remote-handling equipment at each sampling facility are expected to differ. Headspace-gas samples will be analyzed for the analytes listed in Table B3-2 of Permit Attachment B3. If additional packaging configurations are identified, an appropriate Permit Modification will be submitted to incorporate the DAC using the methodology in BWXT (2000). Consistent with footnote "a" in Table B1-8, any waste container selected for headspace gas sampling that cannot be assigned a packaging configuration specified in Table B1-8 shall ~~not~~ be ~~shipped to or accepted for disposal at WIPP~~ assigned a conservative default packaging configuration..

Drum age criteria apply only to 55-gallon drums, 85-gallon drums, 100-gallon drums, standard waste boxes, and TDOPs. Drum age criteria for all other container types must be established through permit modification prior to ~~acceptance of these containers at WIPP~~ performing headspace gas sampling..

The Permittees shall require site personnel to collect samples in SUMMA® or equivalent canisters using standard headspace-gas sampling methods that meet the general guidelines established by the ~~U.S. Environmental Protection Agency (~~EPA~~)~~ in the Compendium Method TO-14, Redetermination of Volatile Organic Compounds (**VOC**) in Ambient Air using ~~Summa~~ SUMMA® Passivated Canister Sampling and Gas Chromatography Analysis (EPA 1988) or by using on-line integrated sampling/analysis systems. Samples will be directed to an analytical instrument instead of being collected in SUMMA® or equivalent canisters if a single-sample on-line integrated sampling/analysis system is used. If a multi-sample on-line integrated sampling/analysis system is used, samples will be directed to an integrated holding area that meets the cleaning requirements of Section B1-1c(1). The leak proof and inert nature of the integrated holding area interior surface must be demonstrated and documented. Samples are not transported to another location when using on-line integrated sampling/analysis systems; therefore, the sample custody requirements of Section B1-4 and B1-5 do not apply. The same sampling manifold and sampling heads are used with on-line integrated sampling/analysis systems and all of the requirements associated with sampling manifolds and sampling heads must be met. However, when using an on-line integrated sampling/analysis system, the sampling batch and analytical batch quality control (**QC**) samples are combined as on-line batch QC samples as outlined in Section B1-1b.

B1-1a(~~4~~2) Manifold Headspace Gas Sampling

This headspace-gas sampling protocol employs a multiport manifold capable of collecting multiple simultaneous headspace samples for analysis and QC purposes. The manifold can be used to collect samples in SUMMA® or equivalent canisters or as part of an on-line integrated sampling/analysis system. The sampling equipment will be leak checked and cleaned prior to first use and as needed thereafter. The manifold and sample canisters will be evacuated to 0.0039 inches (in.) (0.10 millimeters [mm]) mercury (**Hg**) prior to sample collection. Cleaned and evacuated sample canisters will be attached to the evacuated manifold before the manifold inlet valve is opened. The manifold inlet valve will be attached to a changeable filter connected to either a side port needle sampling head capable of forming an airtight seal (for penetrating a filter or rigid poly liner when necessary), a drum punch sampling head capable of forming an airtight seal (capable of punching through the metal lid of a drum for sampling through the drum lid), or a sampling head with an airtight fitting for sampling through a pipe overpack container filter vent hole. Refer to Section B1-1a(~~6~~4) for descriptions of these sampling heads.

The manifold shall also be equipped with a purge assembly that allows applicable QC samples to be collected through all sampling components that may affect compliance with the quality assurance objectives (**QAO~~'~~s**). The Permittees shall require the sites to demonstrate and document the effectiveness of the sampling equipment design in meeting the QAOs. Field blanks shall be samples of room air collected in the sampling area in the immediate vicinity of the waste container to be sampled. If using SUMMA® or equivalent canisters, field blanks shall be collected directly into the canister, without the use of the manifold.

The manifold, the associated sampling heads, and the headspace-gas sample volume requirements shall be designed to ensure that a representative sample is collected. The manifold internal volume must be calculated and documented in a field logbook dedicated to headspace-gas sample collection. The total volume of headspace gases collected during each sampling operation will be determined by adding the combined volume of the canisters attached to the manifold and the internal volume of the manifold. The sample volume should remain small in comparison to the volume of the waste container. When an estimate of the available headspace gas volume in the drum can be made, less than 10 percent of that volume should be withdrawn.

As illustrated in Figure B1-2, the sampling manifold must consist of a sample side and a standard side. The dotted line in Figure B1-2 indicates how the sample side shall be connected to the standard side for cleaning and collecting equipment blanks and field reference standards. The sample side of the sampling manifold shall consist of the following major components:

- An applicable sampling head that forms a leak-tight connection with the headspace sampling manifold.

- A flexible hose that allows movement of the sampling head from the purge assembly (standard side) to the waste container.

- A pressure sensor(s) that must be pneumatically connected to the manifold. This manifold pressure sensor(s) must be able to measure absolute pressure in the range from 0.002 in. (0.05 mm) Hg to 39.3 in. (1,000 mm) Hg. Resolution for the manifold pressure sensors must be ±0.0004 in. (0.01 mm) Hg at 0.002 in. (0.05 mm) of Hg. The manifold pressure sensor(s) must have an operating range from approximately 59°F (15°C) to 104°F (40°C).

- Available ports for attaching sample canisters. If using canister-based sampling methods, a sufficient number of ports shall be available to allow simultaneous collection of headspace-gas samples and duplicates for VOC analyses. If using an on-line integrated sampling/analysis system, only one port is necessary for the collection of comparison samples. Ports not occupied with sample canisters during cleaning or headspace-gas sampling activities require a plug to prevent ambient air from entering the system. In place of using plugs, sites may choose to install valves that can be closed to prevent intrusion of ambient air into the manifold. Ports shall have VCR® fittings for connection to the sample canister(s) to prevent degradation of the fittings on the canisters and manifold.

- Sample canisters, as illustrated in Figure B1-3, are leak-free, stainless steel pressure vessels, with a chromium-nickel oxide (**Cr-NiO**) SUMMA®-passivated interior surface, bellows valve, and a pressure/vacuum gauge. Equivalent designs, such as Silco Steel canisters, may be used so long as the leak proof and inert nature of the canister interior surface is demonstrated and documented. All sample canisters must have VCR® fittings for connection to sampling and analytical equipment. The pressure/vacuum gauge must be mounted on each manifold. The canister must be helium-leak tested to 1.5 x 10^{-7} standard cubic centimeters per second (cc/s), have all stainless steel construction, and be capable of tolerating temperatures to 125°C. The gauge range shall be capable of operating in the leak test range as well as the sample collection range.

- A dry vacuum pump with the ability to reduce the pressure in the manifold to 0.05 mm Hg. A vacuum pump that requires oil may be used, but precautions must be taken to prevent diffusion of oil vapors back to the manifold. Precautions may include the use of a molecular sieve and a cryogenic trap in series between the headspace sampling ports and the pump.

- A minimum distance, based upon the design of the manifold system, between the tip of the needle and the valve that isolates the pump from the manifold in order to minimize the dead volume in the manifold.

- If real-time equipment blanks are not available, the manifold must be equipped with an organic vapor analyzer (**OVA**) that is capable of detecting all analytes listed in Table B3-2 of Permit Attachment B3. The OVA shall be capable of measuring total VOC concentrations below the lowest headspace gas PRQL . Detection of 1,1,2-trichloro-1,2,2-trifluoroethane may not be possible if a photoionization detector is used. The OVA measurement shall be confirmed by the collection of equipment blanks at the frequency specified in Section B1-1 to check for manifold cleanliness.

The standard side must consist of the following major elements:

- A cylinder of compressed zero air, helium, argon, or nitrogen gas that is hydrocarbon and carbon dioxide (**CO_2**)-free (only hydrocarbon and CO_2-free gases required for Fourier Transform Infrared System [**FTIRS**]) to clean the manifold between samples and to provide gas for the collection of equipment blanks or on-line blanks. These high-purity gases shall be certified by the manufacturer to contain less than one ppm total VOCs. The gases must be metered into the standard side of the manifold using devices that are corrosion proof and that do not allow for the introduction of manifold gas into the purge gas cylinders or generator. Alternatively, a zero air or nitrogen generator may be used, provided a sample of the zero air or nitrogen is collected and demonstrated to contain less than one ppm total VOCs. Zero air or nitrogen from a generator shall be humidified (except for use with FTIRS).

- Cylinders of field-reference standard gases or on-line control sample gases. These cylinders provide gases for evaluating the accuracy of the headspace-gas sampling process. Each cylinder of field-reference gas or on-line control sample gas shall have a flow-regulating device. The field-reference standard gases or on-line control sample gas shall be certified by the manufacturer to contain analytes from Table B3-2 of Permit Attachment B3 at known concentrations.

- If using an analytical method other than FTIRS a humidifier filled with American Society for Testing and Materials (**ASTM**) Type I or II water, connected, and opened to the standard side of the manifold between the compressed gas cylinders and the purge assembly shall be used. Dry gases flowing to the purge assembly will pick up moisture from the humidifier. Moisture is added to the dry gases to condition the equipment blanks and field-reference standards and to assist with system cleaning between headspace-gas sample collection. If using FTIRS for analysis, the sample and sampling system shall be kept dry.

  NOTE: Caution should be exercised to isolate the humidifier during the evacuation of the system to prevent flooding the manifold. In lieu of the humidifier, the compressed gas cylinders (e.g., zero air and field-reference standard gas) may contain water vapor in the concentration range of 1,000 to 10,000 parts per million by volume (**ppmv**).

- A purge assembly that allows the sampling head (sample side) to be connected to the standard side of the manifold. The ability to make this connection is required to transfer gases from the compressed gas cylinders to the canisters or on-line analytical instrument. This connection is also required for system cleaning.

- A flow-indicating device or a pressure regulator that is connected to the purge assembly to monitor the flow rate of gases through the purge assembly. The flow rate or pressure through the purge assembly shall be monitored to assure that excess flow exists during cleaning activities and during QC sample collection. Maintaining excess flow will prevent ambient air from contaminating the QC samples and allow samples of gas from the compressed gas cylinders to be collected near ambient pressure.

In addition to a manifold consisting of a sample side and a standard side, the area in which the manifold is operated shall contain sensors for measuring ambient pressure and ambient temperature, as follows:

- The ambient-pressure sensor must have a sufficient measurement range for the ambient barometric pressures expected at the sampling location. It must be kept in the sampling area during sampling operations. Its resolution shall be 0.039 in. (1.0 mm) Hg or less, and calibration performed by the manufacturer shall be based on National Institute of Standards and Technology (**NIST**), or equivalent, standards.

- The temperature sensor shall have a sufficient measurement range for the ambient temperatures expected at the sampling location. The measurement range of the temperature sensor must be from 18°C to 50°C. The temperature sensor calibration shall be traceable to NIST, or equivalent, standards.

B1-1a(~~5~~3) Direct Canister Headspace Gas Sampling

This headspace-gas sampling protocol employs a canister-sampling system to collect headspace-gas samples for analysis and QC purposes without the use of the manifold described above. Rather than attaching sampling heads to a manifold, in this method the sampling heads are attached directly to an evacuated sample canister as shown in Figure B1-4.

Canisters shall be evacuated to 0.0039 in. (0.10 mm) Hg prior to use and attached to a changeable filter connected to the appropriate sampling head. The sampling head(s) must be capable of either punching through the metal lid of the drums (and/or the rigid poly liner when necessary) while maintaining an airtight seal when sampling through the drum lid, penetrating a filter or the septum in the orifice of the self-tapping screw, or maintaining an airtight seal for sampling through a pipe overpack container filter vent hole to obtain the drum headspace samples. Field duplicates must be collected at the same time, in the same manner, and using the same type of sampling apparatus as used for headspace-gas sample collection. Field blanks shall be samples of room air collected in the immediate vicinity of the waste-drum sampling area prior to removal of the drum lid. Equipment blanks and field-reference standards must be collected using a purge assembly equivalent to the standard side of the manifold described above. These samples shall be collected from the needle tip through the same components (e.g., needle and filter) that the headspace-gas samples pass through.

The sample canisters, associated sampling heads, and the headspace-sample volume requirements ensure that a representative sample is collected. When an estimate of the available headspace-gas volume of the waste container can be made, less than 10 percent of that volume should be withdrawn. A determination of the sampling head internal volume shall be made and documented. The total volume of headspace gases collected during each headspace gas sampling operation can be determined by adding the volume of the sample canister(s) attached to the sampling head to the internal volume of the sampling head. Every effort shall be made to minimize the internal volume of sampling heads.

Each sample canister used with the direct canister method shall have a pressure/vacuum gauge capable of indicating leaks and sample collection volumes. Canister gauges are intended to be gross leak-detection devices not vacuum-certification devices. If a canister pressure/vacuum gauge indicates an unexpected pressure change, determination of whether the change is a result of ambient temperature and pressure differences or a canister leak shall be made. This gauge shall be helium-leak tested to 1.5 x 10^{-7} standard cc/s, have all stainless steel construction, and be capable of tolerating temperatures to 125°C.

The SUMMA® or equivalent sample canisters as specified in EPA's Compendium Method TO-14 (EPA 1988) shall be used when sampling each drum. These heads shall form a leak-tight connection with the canister and allow sampling through the drum-lid filter, through the drum lid itself and/or rigid poly liner when necessary (by use of a punch or self-tapping screw), using an airtight fitting to collect the sample through the filter vent hole of a pipe overpack container, or using a hollow side port needle. Figure B1-4 illustrates the direct canister-sampling equipment.

B1-1a(~~6~~4) Sampling Heads

A sample of the headspace gas directly under the container lid, pipe overpack filter vent hole, or rigid poly liner shall be collected. Several methods have been developed for collecting a representative sample: sampling through the filter, sampling through the drum lid by drum punching, sampling through a pipe overpack container filter vent hole, and sampling through the rigid poly liner. The chosen sampling method shall preserve the integrity of the drum to contain radionuclides (e.g., replace the damaged filter, replace set screw in filter housing, seal the punched drum lid).

B1-1a(~~6~~4)(i) Sampling Through the Filter

To sample the drum-headspace gas through the drum's filter, a side-port needle (e.g., a hollow needle sealed at the tip with a small opening on its side close to the tip) shall be pressed through the filter and into the headspace beneath the drum lid. This permits the gas to be drawn into the manifold or directly into the canister(s). To assure that the sample collected is representative, all of the general method requirements, sampling apparatus requirements, and QC requirements described in this section shall be met in addition to the following requirements that are pertinent to drum headspace-gas sampling through the filter:

- The lid of the drum's 90-mil rigid poly liner shall contain a hole for venting to the drum headspace. A representative sample cannot be collected from the drum headspace until the 90-mil rigid poly liner has been vented. If the DAC for Scenario 1 is met, a sample may be collected from inside the 90-mil rigid poly liner. If the sample is collected by removing the drum lid, the sampling device shall form an airtight seal with the rigid poly liner to prevent the intrusion of outside air into the sample (using a sampling needle connected to the sampling head to pierce the rigid poly liner satisfies this requirement). If headspace-gas samples are collected from the drum headspace prior to venting the 90-mil rigid poly liner, the sample is not acceptable and a nonconformance report shall be prepared, submitted, and resolved. Nonconformance procedures are outlined in Permit Attachment B3.

- For sample collection, the drum's filter shall be sealed to prevent outside air from entering the drum and diluting and/or contaminating the sample.

The sampling head for collecting drum headspace by penetrating the filter shall consist of a side-port needle, a filter to prevent particles from contaminating the gas sample, and an adapter to connect the side-port needle to the filter. To prevent cross contamination, the sampling head shall be cleaned or replaced after sample collection, after field-reference standard collection, and after field-blank collection. The following requirements shall also be met:

- The housing of the filter shall allow insertion of the sampling needle through the filter element or a sampling port with septum that bypasses the filter element into the drum headspace.

- The side-port needle shall be used to reduce the potential for plugging.
- The purge assembly shall be modified for compatibility with the side-port needle.

B1-1a(~~6~~4)(ii) Sampling Through the Drum Lid By Drum Lid Punching

Sampling through the drum lid at the time of drum punching or thereafter may be performed as an alternative to sampling through the drum's filter if an airtight seal can be maintained. To sample the drum headspace-gas through the drum lid at the time of drum punching or thereafter, the lid shall be breached using an appropriate punch. The punch shall form an airtight seal between the drum lid and the manifold or direct canister sampling equipment. To assure that the sample collected is representative, all of the general method requirements, sampling apparatus requirements, and QC requirements specified in EPA's Compendium Method TO-14 (EPA 1988) as appropriate, shall be met in addition to the following requirements:

- The seal between the drum lid and sampling head shall be designed to minimize intrusion of ambient air.
- All components of the sampling system that come into contact with sample gases shall be purged with humidified zero air, nitrogen, or helium prior to sample collection.
- Equipment blanks and field reference standards shall be collected through all the components of the punch that contact the headspace-gas sample.
- Pressure shall be applied to the punch until the drum lid has been breached.
- Provisions shall be made to relieve excessive drum pressure increases during drum-punch operations; potential pressure increases may occur during sealing of the drum punch to the drum lid.
- The lid of the drum's 90-mil rigid poly liner shall contain a hole for venting to the drum headspace. A representative sample cannot be collected from the drum headspace until the 90-mil rigid poly liner has been vented. If the DAC for Scenario 1 is met, a sample may be collected from inside the 90-mil rigid poly liner. If headspace-gas samples are collected from the drum headspace prior to venting the 90-mil rigid poly liner, the sample is not acceptable and a nonconformance report shall be prepared, submitted, and resolved. Nonconformance procedures are outlined in Permit Attachment B3.
- During sampling, the drum's filter, if present, shall be sealed to prevent outside air from entering the drum.
- While sampling through the drum lid using manifold sampling, a flow-indicating device or pressure regulator to verify flow of gases shall be pneumatically connected to the drum punch and operated in the same manner as the flow-indicating device described above in Section B1-1a(4).

C Equipment shall be used to adequately secure the drum-punch sampling system to the drum lid.

• If the headspace gas sample is not taken at the time of drum punching, the presence and diameter of the rigid liner vent hole shall be documented during the punching operation for use in determining an appropriate Scenario 2 DAC.

B1-1a(~~6~~4)(iii) Sampling Through a Pipe Overpack Container Filter Vent Hole

Sampling through an existing filter vent hole in a pipe overpack container (**POC**) may be performed as an alternative to sampling through the POC's filter if an airtight seal can be maintained. To sample the container headspace-gas through a POC filter vent hole, an appropriate airtight seal shall be used. The sampling apparatus shall form an airtight seal between the POC surface and the manifold or direct canister sampling equipment. To assure that the sample collected is representative, all of the general method, sampling apparatus, and QC requirements specified in EPA's Compendium Method TO-14 (EPA 1988) as appropriate, shall be met in addition to the following requirements:

C The seal between the POC surface and sampling apparatus shall be designed to minimize intrusion of ambient air.

C The filter shall be replaced as quickly as is practicable with the airtight sampling apparatus to ensure that a representative sample can be taken. Sites must provide documentation demonstrating that the time between removing the filter and installing the airtight sampling device has been established by testing to assure a representative sample.

C All components of the sampling system that come into contact with sample gases shall be cleaned according to requirements for direct canister sampling or manifold sampling, whichever is appropriate, prior to sample collection.

C Equipment blanks and field reference standards shall be collected through all the components of the sampling system that contact the headspace-gas sample.

C During sampling, openings in the POC shall be sealed to prevent outside air from entering the container.

C A flow-indicating device shall be connected to sampling system and operated according to the direct canister or manifold sampling requirements, as appropriate.

B1-1b Quality Control

For manifold and direct canister sampling systems, field QC samples shall be collected on a per sampling batch basis. A sampling batch is a suite of samples collected consecutively using the same sampling equipment within a specific time period. A sampling batch can be up to 20 samples (excluding QC samples), all of which shall be collected within 14 days of the first sample in the batch. For on-line integrated sampling/analysis systems, QC samples shall be collected and analyzed on a per on-line batch basis. Holding temperatures and container requirements for gas sample containers are provided in Table B1-1. An on-line batch is the number of headspace-gas samples collected within a 12-hour period using the same on-line integrated analysis system. The analytical batch requirements are specified by the analytical method being used in the on-line system. Table B1-2 provides a summary of field QC sample collection requirements. Table B1-3 provides a summary of QC sample acceptance criteria.

For on-line integrated sampling analysis systems, the on-line batch QC samples serve as combined sampling batch/analytical batch QC samples as follows:

- The on-line blank replaces the equipment blank and laboratory blank
- The on-line control sample replaces the field reference standard and laboratory control sample
- The on-line duplicate replaces the field duplicate and laboratory duplicate

The acceptance criteria for on-line batch QC samples are the same as for the sampling batch and analytical batch QC samples they replace. Acceptance criteria are shown in Table B1-3. A separate field blank shall still be collected and analyzed for each on-line batch. However, if the results of a field blank collected through the sampling manifold meets the acceptance criterion, a separate on-line blank need not be collected and analyzed.

The Permittees shall require the site project Quality Assurance (**QA**) officer to monitor and document field QC sample results and fill out a nonconformance report if acceptance or frequency criteria are not met. The Permittees shall require the site project manager to ensure appropriate corrective action is taken if acceptance criteria are not met.

B1-1b(1) Field Blanks

Field blanks shall be collected to evaluate background levels of program-required analytes. Field blanks shall be collected prior to sample collection, and at a frequency of one per sampling batch. The Permittees shall require the site project manager to use the field blank data to assess impacts of ambient contamination, if any, on the sample results. Field blank results determined by gas chromatography/mass spectrometry and gas chromatography/flame ionization detection shall be acceptable if the concentration of each VOC analyte is less than or equal to three times the method detection limit (**MDL**) listed in Table B3-2 in Permit Attachment B3. Field blank results determined by FTIRS shall be acceptable if the concentration of each VOC analyte is less than the program required quantitation limit listed in Table B3-2. A nonconformance report shall be initiated and resolved if the final reported QC sample results do not meet the acceptance criteria.

B1-1b(2) Equipment Blanks

Equipment blanks shall be collected to assess cleanliness prior to first use after cleaning of all sampling equipment. On-line blanks will be used to assess equipment cleanliness as well as analytical contamination. After the initial cleanliness check, equipment blanks collected through the manifold shall be collected at a frequency of one per sampling batch for VOC analysis or one per day, whichever is more frequent. If the direct canister method is used, field blanks may be used in lieu of equipment blanks. The Permittees shall require the site project manager to use the equipment blank data to assess impacts of potentially contaminated sampling equipment on the sample results. Equipment blank results determined by gas chromatography/mass spectrometry or gas chromatography/flame ionization detection shall be acceptable if the concentration of each VOC analyte is less than or equal to three times the MDL listed in Table B3-2 in Permit Attachment B3. Equipment blank results determined by FTIRS shall be acceptable if the concentration of each VOC analyte is less than the program required quantitation limit listed in Table B3-2.

B1-1b(3) Field Reference Standards

Field reference standards shall be used to assess the accuracy with which the sampling equipment collects VOC samples into SUMMA® or equivalent canisters prior to first use of the sampling equipment. The on-line control sample will be used to assess the accuracy with which the sampling equipment collects VOC samples as well as an indicator of analytical accuracy for the on-line sampling system. Field reference standards shall contain a minimum of six of the analytes listed in Table B3-2 in Permit Attachment B3 at concentrations within a range of 10 to 100 ppmv and greater than the MDL for each compound. Field reference standards shall have a known valid relationship to a nationally recognized standard (e.g., NIST), if available. If NIST traceable standards are not available and commercial gases are used, a Certificate of Analysis from the manufacturer documenting traceability is required. Commercial stock gases shall not be used beyond their manufacturer-specified shelf life. After the initial accuracy check, field reference standards collected through the manifold shall be collected at a frequency of one per sampling batch and submitted as blind samples to the analytical laboratory. For the direct canister method, field reference standard collection may be discontinued if the field reference standard results demonstrate the ~~quality assurance objectives (~~QAO~~)~~ for accuracy specified in Appendix B3. Field reference standard results shall be acceptable if the accuracy for each tested compound has a recovery of 70 to 130 percent .

B1-1b(4) Field Duplicates

Field duplicate samples shall be collected sequentially and in accordance with Table B1-1 to assess the precision with which the sampling procedure can collect samples into SUMMA® or equivalent canisters. Field duplicates will also serve as a measure of analytical precision for the on-line sampling system. Field duplicate results shall be acceptable if the relative percent difference is less than or equal to 25 for each tested compound found in concentrations greater than the PRQL in both duplicates.

B1-1c Equipment Testing, Inspection and Maintenance

All sampling equipment components that come into contact with headspace sample gases shall be constructed of relatively inert materials such as stainless steel or Teflon®. A passivated interior surface on the stainless steel components is recommended.

To minimize the potential for cross contamination of samples, the headspace sampling manifold and sample canisters shall be properly cleaned and leak-checked prior to each headspace-gas sampling event. Procedures used for cleaning and preparing the manifold and sample canisters shall be equivalent to those provided in EPA's Compendium Method TO-14 (EPA 1988). Cleaning requirements are presented below.

B1-1c(1) Headspace-Gas Sample Canister Cleaning

SUMMA® or equivalent canisters used in these methods shall be subjected to a rigorous cleaning and certification procedures prior to use in the collection of any samples. Guidance for the development of this procedure has been derived from Method TO-14 (EPA 1988). Specific detailed instructions shall be provided in laboratory standard operating procedures (**SOPs**) for the cleaning and certification of canisters.

Canisters shall be cleaned and certified on an equipment cleaning batch basis. An equipment cleaning batch is any number of canisters cleaned together at one time using the same cleaning method. A cleaning system, capable of processing multiple canisters at a time, composed of an oven (optional) and a vacuum manifold which uses a dry vacuum pump or a cryogenic trap backed by an oil sealed pump shall be used to clean SUMMA® or equivalent canisters. Prior to cleaning, a positive or negative pressure leak test shall be performed on all canisters. The duration of the leak test must be greater than or equal to the time it takes to collect a sample, but no greater than 24 hours. For a leak test, a canister passes if the pressure does not change by a rate greater than ±2 psig per 24 hours. Any canister that fails shall be checked for leaks, repaired, and reprocessed. One canister per equipment cleaning batch shall be filled with humid zero air or humid high purity nitrogen and analyzed for VOCs. The equipment cleaning batch of canisters shall be considered clean if there are no VOCs above three times the MDLs listed in Table B3-2 of Permit Attachment B3. After the canisters have been certified for leak-tightness and found to be free of background contamination, they shall be evacuated to 0.0039 in. (0.10 mm) Hg or less for storage prior to shipment. The Permittees shall require the laboratory responsible for canister cleaning and certification to maintain canister certification documentation and initiate the canister tags as described in Permit Attachment B3.

B1-1c(2) Sampling Equipment Initial Cleaning and Leak Check

The surfaces of all headspace-gas sampling equipment components that will come into contact with headspace gas shall be thoroughly inspected and cleaned prior to assembly. The manifold and associated sampling heads shall be purged with humidified zero air, nitrogen, or helium, and leak checked after assembly. This cleaning shall be repeated if the manifold and/or associated sampling heads are contaminated to the extent that the routine system cleaning is inadequate.

B1-1c(3) Sampling Equipment Routine Cleaning and Leak Check

The manifold and associated sampling heads which are reused shall be cleaned and checked for leaks in accordance with the cleaning and leak check procedures described in EPA's Compendium Method TO-14 (EPA 1988). The procedures shall be conducted after headspace gas and field duplicate collection; after field blank collection, after field blanks are collected through the manifold; and after the additional cleaning required for field reference standard collection has been completed. The protocol for routine manifold cleaning and leak check requires that sample canisters be attached to the canister ports, or that the ports be capped or closed by valves, and requires that the sampling head be attached to the purge assembly.

VOCs shall be removed from the internal surfaces of the headspace sampling manifold to levels that are less than or equal to three times the MDLs of the analytes listed in Table B3-2 of Permit Attachment B3, as determined by analysis of an equipment blank or through use of an OVA. It is recommended that the headspace sampling manifold be heated to 150° Centigrade and periodically evacuated and flushed with humidified zero air, nitrogen, or helium. When not in use, the manifold shall be demonstrated clean before storage with a positive pressure of high purity gas (i.e., zero air, nitrogen, or helium) in both the standard and sample sides.

Sampling shall be suspended and corrective actions shall be taken when the analysis of an equipment blank indicates that the VOC limits have been exceeded or if a leak test fails. The Permittees shall require the site project manager to ensure that corrective action has been taken prior to resumption of sampling.

B1-1c(4) Manifold Cleaning After Field Reference Standard Collection

The sampling system shall be specially cleaned after a field reference standard has been collected, because the field reference standard gases contaminate the standard side of the headspace sampling manifold when they are regulated through the purge assembly. This cleaning requires the installation of a gas-tight connector in place of the sampling head, between the flexible hose and the purge assembly. This configuration allows both the sample and standard sides of the sampling system to be flushed (evacuated and pressurized) with humidified zero air, nitrogen, or helium which, combined with heating the pneumatic lines, should sweep and adequately clean the system's internal surfaces. After this protocol has been completed and prior to collecting another sample, the routine system cleaning and leak check (see previous section) shall also be performed.

B1-1c(5) Sampling Head Cleaning

To prevent cross contamination, the needle, airtight fitting or airtight seal, adapters, and filter of the sampling heads shall be cleaned in accordance with the cleaning procedures described in EPA's Compendium Method TO-14 (EPA 1988). After sample collection, a sampling head shall be disposed of or cleaned in accordance with EPA's Compendium Method TO-14 (EPA 1988), prior to reuse. As a further QC measure, the needle, airtight fitting or airtight seal, and filter, after cleaning, should be purged with zero air, nitrogen, or helium and capped for storage to prevent sample contamination by VOCs potentially present in ambient air.

B1-1d Equipment Calibration and Frequency

The manifold pressure sensor shall be certified prior to initial use, then annually, using NIST traceable, or equivalent, standards. If necessary, the pressure indicated by the pressure sensor(s) shall be temperature compensated. The ambient air temperature sensor, if present, shall be certified prior to initial use, then annually, to NIST traceable, or equivalent, temperature standards.

The OVA shall be calibrated once per day, prior to first use, or as necessary according to the manufacturer's specifications. Calibration gases shall be certified to contain known analytes from Table B3-2 of Permit Attachment B3 at known concentrations. The balance of the OVA calibration gas shall be consistent with the manifold purge gas when the OVA is used (i.e., zero air, nitrogen, or helium).

B1-2 Sampling of Homogeneous Solids and Soil/Gravel (Summary Categories S3000/S4000)

For those waste streams without an AK Sufficiency Determination approved by the Permittees, randomly selected containers of homogeneous solid and/or soil/gravel waste streams (S3000/S4000) shall be sampled and analyzed to resolve the assignment of EPA hazardous waste numbers. For example, analytical results may be useful to resolve uncertainty regarding hazardous constituents used in a process that generated the waste stream when the hazardous constituents are not documented in the acceptable knowledge information for the waste.

B1-2a Method Requirements

The methods used to collect samples of transuranic (**TRU**) mixed waste, classified as homogeneous solids and soil/gravel from waste containers, shall be such that the samples are representative of the waste from which they were taken. To minimize the quantity of investigation-derived waste, laboratories conducting the analytical work may require no more sample than is required for the analysis, based on the analytical methods. However, a sufficient number of samples shall be collected to adequately represent waste being sampled. For those waste streams defined as Summary Category Groups S3000 or S4000 in Attachment B, debris that may also be present within these wastes need not be sampled.

Samples of retrievably stored waste containers will be collected using appropriate coring equipment or other EPA approved methods to collect a representative sample. Newly generated wastes that are sampled from a process as it is generated may be sampled using EPA approved methods, including scoops and ladles, that are capable of collecting a representative sample. All sampling and core sampling will comply with the QC requirements specified in B1-2b.

B1-2a(1) Core Collection

Coring tools shall be used to collect cores of homogeneous solids and soil/gravel from waste containers, when possible, in a manner that minimizes disturbance to the core. A rotational coring tool (i.e., a tool that is rotated longitudinally), similar to a drill bit, to cut, lift the waste cuttings, and collect a core from the bore hole, shall be used to collect sample cores from waste containers. For homogeneous solids and soil/gravel that are relatively soft, non-rotational coring tools may be used in lieu of a rotational coring tool.

To provide a basis for describing the requirements for core collection, diagrams of a rotational coring tool (i.e., a light weight auger) and a non-rotational coring tool (i.e., a thin-walled sampler) are provided in Figures B1-5 and B1-6, respectively.

The following requirements apply to the use of coring tools:

- Each coring tool shall contain a removable tube (liner) that is constructed of fairly rigid material unlikely to affect the composition and/or concentrations of target analytes in the sample core. Materials that are acceptable for use for coring device sleeves are polycarbonate, teflon, or glass for most samples, and stainless steel or brass if samples are not to be analyzed for metals. The Permittees shall require site quality assurance project plans (**QAPjPs**) to document that analytes of concern are not present in liner material. The Permittees shall also require sites to document that the materials are unlikely to affect sample results through the collection and analysis of an equipment blank prior to first use as specified in the 'Equipment Blanks' section of this appendix. Liner outer diameter is recommended to be no more than 2 in. and no less than one in. Liner wall thickness is recommended to be no greater than 1/16 in. Before use, the liner shall be cleaned in accordance the requirements in Section B1-2b. The liner shall fit flush with the inner wall of the coring tool and shall be of sufficient length to hold a core that is representative of the waste along the entire depth of the waste. The depth of the waste is calculated as the distance from the top of the sludge to the bottom of the drum (based on the thickness of the liner and the rim at the bottom of the drum). The liner material shall have sufficient transparency to allow visual examination of the core after sampling. If sub-sampling is not conducted immediately after core collection and liner extrusion, then end caps constructed of material unlikely to affect the composition and/or concentrations of target analytes in the core (e.g., Teflon®) shall be placed over the ends of the liner. End caps shall fit tightly to the ends of the liner. The Permittees shall require site specific QAPjPs to indicate the acceptable materials for core liners and end caps.

- A spring retainer, similar to that illustrated in Figures B1-5 and B1-6, shall be used with each coring tool when the physical properties of the waste are such that the waste may fall out of the coring tool's liner during sampling activities. The spring retainer shall be constructed of relatively inert material (e.g., stainless steel or Teflon®) and its inner diameter shall not be less than the inner diameter of the liner. Before use, spring retainers shall be cleaned in accordance with the requirements in Section B1-2b.

- Coring tools may have an air-lock mechanism that opens to allow air inside the liners to escape as the tool is pressed into the waste (e.g., ball check valve). If used, this air-lock mechanism shall also close when the core is removed from the waste container.

- After disassembling the coring tool, a device (extruder) to forcefully extrude the liner from the coring tool shall be used if the liner does not slide freely. All surfaces of the extruder that may come into contact with the core shall be cleaned in accordance with the requirements in Section B1-2(b) prior to use.

- Coring tools shall be of sufficient length to hold the liner and shall be constructed to allow placement of the liner leading edge as close as possible to the coring tools leading edge.

- All surfaces of the coring tool that have the potential to contact the sample core or sample media shall be cleaned in accordance with the requirements in Section B1-2(b) prior to use.

- C The leading edge of the coring tools may be sharpened and tapered to a diameter equivalent to, or slightly smaller than, the inner diameter of the liner to reduce the drag of the homogeneous solids and soil/gravel against the internal surfaces of the liner, thereby enhancing sample recovery.

- C Rotational coring tools shall have a mechanism to minimize the rotation of the liner inside the coring tool during coring activities, thereby minimizing physical disturbance to the core.

- C Rotational coring shall be conducted in a manner that minimizes transfer of frictional heat to the core, thereby minimizing potential loss of VOCs.

- C Non-rotational coring tools shall be designed such that the tool's kerf width is minimized. Kerf width is defined as one-half of the difference between the outer diameter of the tool and the inner diameter of the tool's inlet.

B1-2a(2) Sample Collection

Sampling of cores shall be conducted in accordance with the following requirements:

- C Sampling shall be conducted as soon as possible after core collection. If a substantial delay (i.e., more than 60 minutes) is expected between core collection and sampling, the core shall remain in the liner and the liner shall be capped at each end. If the liner containing the core is not extruded from the coring tool and capped, then two alternatives are permissible: 1) the liner shall be left in the coring tool and the coring tool shall be capped at each end, or 2) the coring tool shall remain in the waste container with the air-lock mechanism attached.

- C Samples of homogeneous solids and soil/gravel for VOC analyses shall be collected prior to extruding the core from the liner. These samples may be collected by collecting a single sample from the representative subsection of the core, or three sub-samples may be collected from the vertical core to form a single 15-gram composite sample. Smaller sample sizes may be used if method PRQL requirements are met for all analytes. The sampling locations shall be randomly selected. If a single sample is used, the representative subsection is chosen by randomly selecting a location along the portion of the core (i.e. core length). If the three sub-sample method is used, the sampling locations shall be randomly selected within three equal-length subsections of the core along the long axis of the liner and access to the waste shall be gained by making a perpendicular cut through the liner and the core. The Permittees shall require sites to develop documented procedures to select, and record the selection, of random sampling locations. True random sampling involves the proper use of random numbers for identifying sampling locations. The procedures used to select the random sampling locations will be subject to review as part of annual audits by the Permittees. A sampling device such as the metal coring cylinder described in EPA's SW-846 Manual (1996), or equivalent, shall be immediately used to collect the sample once the core has been exposed to air. Immediately after sample collection, the sample shall be extruded into 40-ml volatile organics analysis (**VOA**) vials (or other containers specified in appropriate SW-846 methods), the top rim of the vial visually inspected and wiped clean of any waste residue, and the vial cap secured. Sample handling requirements are outlined in Table B1-4. Additional guidance for this type of sampling can be found in SW-846 (EPA 1996).

C Samples of the homogeneous solids and soil/gravel for semi-volatile organic compound and metals analyses shall be collected. These samples may be collected from the same sub-sample locations and in the same manner as the sample collected for VOC analysis, or they may be collected by splitting or compositing the representative subsection of the core. The representative subsection is chosen by randomly selecting a location along the portion of the core (i.e. core length). The Permittees shall require sites to develop documented procedures to select, and record the selection, of random sampling locations. True random sampling involves the proper use of random numbers for identifying sampling locations. The procedures used to select the random sampling locations will be subject to review as part of annual audits by the Permittees. Guidance for splitting and compositing solid materials can be found in SW-846 (EPA 1996). All surfaces of the sampling tools that have the potential to come into contact with the sample shall be constructed of materials unlikely to affect the composition or concentrations of target analytes in the waste (e.g., Teflon®). In addition, all surfaces that have the potential to come into contact with core sample media shall either be disposed or decontaminated according to the procedures found in Section B1-2(b). Sample sizes and handling requirements are outlined in Table B1-4.

Newly generated waste samples may be collected using methods other than coring, as discussed in Section B1-2a. Newly generated wastes samples will be collected as soon as possible after sampling, but the spatial and temporal homogeneity of the waste stream dictate whether a representative grab sample or composite sample shall be collected. As part of the site audit, the Permittees shall assess waste sampling to ensure collection of representative samples.

B1-2b Quality Control

QC requirements for sampling of homogeneous solids and soil/gravel include collecting co-located samples from cores or other sample types to determine precision; equipment blanks to verify cleanliness of the sampling and coring tools and sampling equipment; and analysis of reagent blanks to ensure reagents, such as deionized or high pressure liquid chromatography (**HPLC**) water, are of sufficient quality. Coring and sampling of homogeneous solids and soil/gravel shall comply, at minimum, with the following QC requirements.

B1-2b(1) Co-located Samples

In accordance with the requirement to collect field duplicates required by the ~~Environmental Protection Agency (~~EPA~~)~~ methods found in SW-846 (EPA 1996), samples shall be collected to determine the combined precision of the coring and sampling procedures. The co-located core methodology is a duplicate sample collection methodology intended to collect samples from a second core placed at approximately the same location within the drum when samples are collected by coring. Waste may not be amenable to coring in some instances. In this case, a co-located sample may be collected from a sample (e.g. scoop) collected from approximately the same location in the waste stream. A sample from each co-located core or waste sample collected by other means shall be collected side by side as close as feasible to one another, handled in the same manner, visually inspected through the transparent liner (if cored), and sampled in the same manner at the same randomly selected sample location(s). If the visual examination detects inconsistencies such as color, texture, or waste type in the waste at the sample location, another sampling location may be randomly selected, or the samples may be invalidated and co-located samples or cores may again be collected. Co-located samples, from either core or other sample type, shall be collected at a frequency of one per sampling batch or once per week, whichever is more frequent. A sampling batch is a suite of homogeneous solids and soil/gravel samples collected consecutively using the same sampling equipment within a specific time period. A sampling batch can be up to 20 samples (excluding field QC samples), all of which shall be collected within 14 days of the first sample in the batch.

B1-2b(2) Equipment Blanks

In accordance with SW-846 (EPA 1996), equipment blanks shall be collected from fully assembled sampling and coring tools (i.e., at least those portions of the sampling equipment that contact the sample) prior to first use after cleaning at a frequency of one per equipment cleaning batch. An equipment cleaning batch is the number of sampling equipment items cleaned together at one time using the same cleaning method. The equipment blank shall be collected from the fully assembled sampling or coring tool, in the area where the sampling or coring tools are cleaned, prior to covering with protective wrapping and storage. The equipment blank shall be collected by pouring clean water (e.g., deionized water, HPLC water) down the inside of the assembled sampling or coring tool. The water shall be collected in a clean sample container placed at the leading edge of the sampling or coring tool and analyzed for the analytes listed in Tables B3-4, B3-6, and B3-8 of Permit Attachment B3. The results of the equipment blank will be considered acceptable if the analysis indicates no analyte at a concentration greater than three times the MDLs listed in Tables B3-4 and B3-6 or in the Program Required Detection Limits (**PRDL**) in Table B3-8 of Permit Attachment B3. If analytes are detected at concentrations greater than three times the MDLs (or PRDLs for metals), then the associated equipment cleaning batch of sampling or coring tools shall be cleaned again and another equipment blank collected. Equipment from an equipment cleaning batch may not be used until analytical results have been received verifying an adequately low level of contamination in the equipment blank.

Equipment blanks for coring tools shall be collected from liners that are cleaned separately from the coring tools. These equipment blanks shall be collected at a frequency of one per equipment cleaning batch. The equipment blanks shall be collected by randomly selecting a liner from the equipment cleaning batch, pouring clean water (e.g., deionized water or HPLC water) across its internal surface, collecting the water in a clean sample container, and analyzing the water for the analytes listed in Tables B3-4, B3-6, and the PRDLs in Table B3-8 of Permit Attachment B3. The results of the equipment blank analysis will be considered acceptable if the results indicate no analyte at a concentration greater than three times the MDLs listed in Tables B3-4, B3-6, or B3-8 of Permit Attachment B3. If analytes are detected at concentrations greater than three times the MDLs (or PRDLs for metals), then the associated equipment cleaning batch of liners shall be cleaned again and another equipment blank collected. Equipment from an equipment cleaning batch may not be used until analytical results have been received verifying an adequately low level of contamination in the equipment blank.

Sampling equipment (e.g., bowls, spoons, chisel, VOC sub-sampler) shall also be cleaned. Equipment blanks shall be collected for the sampling equipment at a frequency of one per equipment cleaning batch. After the sampling equipment has been cleaned, one item from the equipment cleaning batch is randomly selected, water (e.g., deionized water, HPLC water) is passed over its surface, collected in a clean container, and analyzed for the analytes listed in Tables B3-4, B3-6, and B3-8 of Permit Attachment B3. The results of the equipment blank will be considered acceptable if the results indicate no analyte present at a concentration greater than three times the MDLs listed in Tables B3-4 and B3-6 and in the PRDLs in B3-8 of Permit Attachment B3. If analytes are detected at concentrations greater than three times the MDLs (or PRDLs for metals), then the associated equipment cleaning batch of sampling equipment shall be cleaned again and another equipment blank collected. Equipment from an equipment cleaning batch may not be used until analytical results have been received verifying an adequately low level of contamination in the equipment blank. The above equipment blanks may be performed on a purchased batch basis for sampling equipment purchased sterile and sealed in protective packaging. Equipment blanks need not be performed for equipment purchased in sealed protective packaging accompanied by a certificate certifying cleanliness.

The results of equipment blanks shall be traceable to the items in the equipment cleaning batch that the equipment blank represents. All sampling items should be identified, and the associated equipment cleaning batch should be documented. The method of documenting the connection between equipment and equipment cleaning batches shall be documented. Equipment blank results for the coring tools, liners, and sampling equipment shall be reviewed prior to use. A sufficient quantity of these items should be maintained in storage to prevent disruption of sampling operations.

The Permittees may require a site to use certified clean disposable sampling equipment and discard liners and sampling tools after one use. In this instance, cleaning and equipment blank collection is not required.

B1-2b(3) Coring Tool and Sampling Equipment Cleaning

Coring tools and sampling equipment shall be cleaned in accordance with the following requirements:

- All surfaces of coring tools and sampling equipment that will come into contact with the samples shall be clean prior to use. All sampling equipment shall be cleaned in the same manner. Immediately following cleaning, coring tools and sampling equipment shall be assembled and sealed inside clean protective wrapping.

- Each reusable sampling or coring tool shall have a unique identification number. Each number shall be referenced to the waste container on which it was used. This information shall be recorded in the field records. One sampling or coring tool from each equipment cleaning batch shall be tested for cleanliness in accordance with the requirements specified above. The identification number of the sampling or coring tool from which the equipment blank was collected shall be recorded in the field records. The results of the equipment blank analysis for the equipment cleaning batch in which each sampling or coring tool was cleaned shall be submitted to the sampling facility with the identification numbers of all sampling or coring tools in the equipment cleaning batch. If analytes are detected at concentrations greater than three times the MDLs (or PRDLs for metals), then the associated equipment cleaning batch of sampling equipment shall be cleaned again and another equipment blank collected. Equipment from an equipment cleaning batch may not be used until analytical results have been received verifying an adequately low level of contamination in the equipment blank.

- Sample containers shall be cleaned in accordance with SW-846 (EPA 1996).

B1-2c Equipment Testing, Inspection and Maintenance

Prior to initiation of sampling or coring activities, sampling and coring tools shall be tested in accordance with manufacturer specifications to ensure operation within the manufacturer's tolerance limits. Other specifications specific to the sampling operations (e.g., operation of containment structure and safety systems) should also be tested and verified as operating properly prior to initiating coring activities. Coring tools shall be assembled, including liners, and tested. Air-lock mechanisms and rotation mechanisms shall be inspected for free movement of critical parts. Sampling and coring tools found to be malfunctioning shall be repaired or replaced prior to use.

Coring tools and sample collection equipment shall be maintained in accordance with manufacturer's specifications. Clean sampling and coring tools and sampling equipment shall be sealed inside clean protective wrapping and maintained in a clean storage area prior to use. Sampling equipment shall be properly maintained to avoid contamination. A sufficient supply of spare parts should be maintained to prevent delays in sampling activities due to equipment down time. Records of equipment maintenance and repair shall be maintained in the field records in accordance with site SOPs.

Inspection of sampling equipment and work areas shall include the following:

- Sample collection equipment in the immediate area of sample collection shall be inspected daily for cleanliness. Visible contamination on any equipment (e.g., waste on floor of sampling area, hydraulic fluid from hoses) that has the potential to contaminate a waste core or waste sample shall be thoroughly cleaned upon its discovery.

- The waste coring and sampling work areas shall be maintained in clean condition to minimize the potential for cross contamination between waste (including cores) and samples.

- Expendable equipment (e.g., plastic sheeting, plastic gloves) shall be visually inspected for cleanliness prior to use and properly discarded after each sample.

- Prior to removal of the protective wrapping from a coring tool designated for use, the condition of the protective wrapping shall be visually assessed. Coring tools with torn protective wrapping should be returned for cleaning. Coring tools visibly contaminated after the protective wrapping has been removed shall not be used and shall be returned for cleaning or properly discarded.

- Sampling equipment shall be visually inspected prior to use. All sampling equipment that comes into contact with waste samples shall be stored in protective wrapping until use. Prior to removal of the protective wrapping from sampling equipment, the condition of the protective wrapping shall be visually assessed. Sampling equipment with torn protective wrapping should be discarded or returned for cleaning. Sampling equipment visibly contaminated after the protective wrapping has been removed shall not be used and shall be returned for cleaning or properly discarded.

- Cleaned sampling and coring equipment will be physically segregated from all equipment that has been used for a sampling event and has not been decontaminated.

B1-2d Equipment Calibration and Frequency

The scale used for weighing sub-samples shall be calibrated as necessary to maintain its operation within manufacturer's specification, and after repairs and routine maintenance. Weights used for calibration shall be traceable to a nationally recognized standard. Calibration records shall be maintained in the field records.

B1-3 Radiography

~~B1-3a Methods Requirements~~

Radiography has been developed by the Permittees specifically to aid in the examination and identification of containerized waste. The Permittees shall require that sites describe all activities required to achieve the radiography objectives in site QAPjPs and SOPs. These SOPs should include instructions specific to the radiography system(s) used at the site. For example, to detect liquids, some systems require the container to be rotated back and forth while other systems require the container to be tilted.

A radiography system (e.g., real time radiography, digital radiography/computed tomography) normally consists of an X-ray-producing device, an imaging system, an enclosure for radiation protection, a waste container handling system, an audio/video recording system, and an operator control and data acquisition station. Although these six components are required, it is expected there will be some variation within a given component between sites. The radiography system shall have controls or an equivalent process which allow the operator to control image quality. On some radiography systems, it should be possible to vary the voltage, typically between 150 to 400 kilovolts (**kV**), to provide an optimum degree of penetration through the waste. For example, high-density material should be examined with the X-ray device set on the maximum voltage. This ensures maximum penetration through the waste container. Low-density material should be examined at lower voltage settings to improve contrast and image definition.

The imaging system typically utilizes either a fluorescent screen and a low-light television camera or x-ray detectors to generate the image.

To perform radiography, the waste container is scanned while the operator views the television screen. ~~An audio/videotape or equivalently non-alterable media~~ 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 ~~and estimated waste material parameter weights of the waste. The estimated waste material parameter and weights should be determined by compiling an inventory of waste items, residual materials, and packaging materials. The items on this inventory should be sorted by waste material parameter and combined with a standard weight look-up table to provide an estimate of waste material parameter weights~~, 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 ~~tape~~ video and audio recording will be considered classified. The radiography data forms will not be considered classified.

~~B1-3b Quality Control~~

The radiography system involves qualitative and semiquantitative evaluations of visual displays. Operator training and experience are the most important considerations for ~~assuring~~ 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 ~~and shall comply with the training and qualification requirements stipulated in this WAP~~.

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 ~~Waste Analysis Plan (~~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).

~~Although the site-specific training programs will vary to some degree, the Permittees shall require each site's program to contain the following required elements based on the following requirements:~~

~~B1-3b(1) Formal Training~~

- ~~Project Requirements~~
- ~~State and Federal Regulations~~
- ~~Basic Principles of Radiography~~
- ~~Radiographic Image Quality~~
- ~~Radiographic Scanning Techniques~~
- ~~Application Techniques~~
- ~~Radiography of Waste Forms~~
- ~~Standards, Codes, and Procedures for Radiography~~
- ~~Site-Specific Instruction~~

~~B1-3b(2) On-the-Job Training~~

- ~~System Operation~~
- ~~Identification of Packaging Configurations~~
- ~~Identification of Waste Material Parameters~~
- ~~Weight and Volume Estimation~~
- ~~Identification of Prohibited Items~~

~~A radiography test drum shall include items common to the waste streams to be generated/stored at the generator/storage site. The test drums shall be divided into layers with varying packing densities or different drums may be used to represent different situations that may occur during radiography examination at the site. Test drums representative of the waste matrix codes for which Waste Stream Profile Form approval is sought must be examined and successfully identified prior to waste stream shipment. The following is a list of required elements of a radiography test drum(s):~~

- ~~Aerosol can with puncture~~
- ~~Horsetail bag~~
- ~~Pair of coveralls~~
- ~~Empty bottle~~
- ~~Irregular shaped pieces of wood~~
- ~~Empty one gallon paint can~~
- ~~Full container~~
- ~~Aerosol can with fluid~~

- ~~One gallon bottle with three tablespoons of fluid~~
- ~~One gallon bottle with one cup of fluid (upside down)~~
- ~~Leaded glove or leaded apron~~
- ~~Wrench~~

~~These items shall be successfully identified by the operator as part of the qualification process. Qualification of radiography operators shall, at a minimum, encompass the following requirements:~~

- ~~Successfully pass a comprehensive exam based upon training enabling objectives. This exam will be reviewed as part of the Permittees' Audit and Surveillance Program (Permit Attachment B6). The comprehensive exam will address all of the Radiography operation, documentation, characterization, and procedural elements stipulated in this WAP.~~

- ~~Perform practical capability demonstration in the presence of appointed site radiography subject matter expert. This person is an experienced radiography operator who is qualified as an OJT trainer.~~

~~Requalification of operators shall be based upon evidence of continued satisfactory performance (primarily audio/videotape reviews) and shall be done at least every two years. Unsatisfactory performance will result in disqualification. Unsatisfactory performance is defined as the misidentification of a prohibited item in a training drum or a score of less than 80% on the comprehensive exam. Retraining and demonstration of satisfactory performance are required before a disqualified operator is again allowed to operate the radiography system.~~

A training drum with internal container of various sizes shall be scanned biannually by each operator. The audio~~/~~ and video~~tape or equivalent~~ media shall then be reviewed by a supervisor to ensure that operators' interpretations remain consistent and accurate. Imaging system characteristics shall be verified on a routine basis.

Independent replicate scans and replicate observations of the video output of the radiography process shall be performed under uniform conditions and procedures. Independent replicate scans shall be performed on one waste container per day or once per testing batch, whichever is less frequent. Independent observations of one scan (not the replicate scan) shall also be made once per day or once per testing batch, whichever is less frequent, by a qualified radiography operator other than the individual who performed the first examination. A testing batch is a suite of waste containers undergoing radiography using the same testing equipment. A testing batch can be up to 20 waste containers without regard to waste matrix.

Oversight functions include periodic audio/video tape reviews of accepted waste containers and shall be performed by qualified radiography personnel other than the operator who dispositioned the waste container. The results of this independent verification shall be available to the radiography operator. The Permittees shall require the site project ~~QA officer~~ manager to be responsible for monitoring the quality of the radiography data and calling for corrective action, when necessary.

B1-~~3b(3)~~4 Visual Examination

~~As an additional QC check, or in~~ In lieu of radiography, the waste container contents ~~shall~~ may be verified directly by visual examination of the waste container contents. Visual examination ~~shall~~ may be performed on ~~a statistically determined portion of~~ waste containers to verify ~~the results of radiography. With the exception of items or conditions that could pose a hazard to visual examination personnel, the radiography results shall not be made available until after the visual examination is completed. This verification shall include~~ the Waste Matrix Code and ~~waste material parameter weights. The verification shall be performed through a comparison of radiography and visual examination results. The Waste Matrix Code is determined and waste material parameter weights are estimated~~ to verify that the container is properly included in the appropriate waste stream. ~~The results of the visual examination shall be transmitted to the radiography facility.~~

Visual examination shall be conducted to describe all contents of a waste container, ~~and includes estimated or measured weights of the contents. The description shall~~ clearly identifying all discernible waste items, residual materials, packaging materials, or waste material parameters. ~~Visual examination experts who are experienced and trained shall assess the need to open individual bags or packages of waste. If individual bags/packages are not opened, estimated weights shall be recorded. Estimated weights shall be established through the use of historically derived waste weight tables and an estimation of the waste volumes. It may not be possible to see through inner bags because of discoloration, dust, or because inner containers are sealed. In these instances, documented acceptable knowledge may be used to identify the Waste Matrix Code and estimated waste material parameter weights. If acceptable knowledge is insufficient for individual bags/packages, actual weights of waste items, residual materials, packaging materials, or waste material parameters shall be recorded.~~ All visual examination activities shall be documented on video/audio media, or alternatively, by using a second operator to provide additional verification by reviewing the contents of the waste container to ensure correct reporting. ~~and the~~ The results of all visual examination shall be documented on visual examination data forms.

Visual examination recorded on video/audio media shall meet the following minimum requirements:

C The video/audio media shall record the waste packaging event for the container such that all waste items placed into the container are recorded in sufficient detail that another trained visual examination expert can determine what the waste items are and their associated waste material parameter.

C The video/audio media shall capture the waste container identification number.

C The personnel loading the waste container shall be identified on the video/audio media or on packaging records traceable to the loading of the waste container.

C The date of loading of the waste container will be recorded on the video/audio media or on packaging records traceable to the loading of the waste container.

Visual examination performed using two generator site personnel 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 another trained visual examination expert can identify the associated waste material parameters.
- The waste container identification number shall be recorded on the data forms or packaging logs.

Visual examination video~~ tapes~~/audio media of containers which contain classified shapes shall be considered classified information. Visual examination data forms or packaging logs will not be considered classified information.

~~The visual examination shall consist of a semi-quantitative and/or qualitative evaluation of the waste container contents, and shall be recorded on audio/videotape. The visual examination program has been developed by the Permittees to provide an acceptable level of confidence in radiography. There is no equivalent method found in EPA sampling and analysis guidance documents. The specific requirements of visual examination are described in this WAP.~~

Standardized training for visual inspection shall be developed~~ to include both formal classroom training and OJT~~. Visual inspectors shall be instructed in the specific waste generating processes, typical packaging configurations, and expected waste material parameters expected to be found in each Waste Matrix Code at the site.~~ The OJT and apprenticeship shall be conducted by an operator experienced and qualified in visual examination prior to qualification of the candidate.~~ The training shall be site specific to include the various waste configurations generated/stored at the site. For example, the particular physical forms and packaging configurations at each site will vary so operators shall be trained on types of waste that are generated, stored, and/or characterized at that particular site. Visual examination personnel shall be requalified once every two years.

~~Although site-specific training programs will vary to some degree, the Permittees shall require each site's program to contain the following required elements:~~

~~B1-3b(4) Formal Training~~

- ~~Project Requirements~~
- ~~State and Federal Regulations~~
- ~~Application Techniques~~
- ~~Site-Specific Instruction~~

~~B1-3b(5) On-the-Job Training~~

- ~~Identification of Packaging Configurations~~
- ~~Identification of Waste Material Parameters~~

- ~~Weight and Volume Estimation~~
- ~~Identification of Prohibited Items~~

Each visual examination facility shall designate a visual examination expert. The visual examination expert shall be familiar with the waste generating processes that have taken place at that site and also be familiar with all of the types of waste being characterized at that site. The visual examination expert shall be responsible for the overall direction and implementation of the visual examination at that facility. The Permittees shall require site QAPjPs to specify the selection, qualification, and training requirements of the visual examination expert.

~~Figure B1-7 illustrates the overall programmatic approach to the visual examination of waste. If the waste is homogeneous, the expert may decide that a limited visual examination involving a confirmation of the radiography data is appropriate. If the waste is heterogeneous, the expert may decide a full visual examination by opening bags and segregating waste is warranted. Various degrees of segregation are possible based on the expert's judgment and availability of acceptable knowledge data. Site QAPjPs shall specify decision-making criteria for the visual examination expert. In all cases, SOPs shall be developed to support the visual examination process, and the basis for the expert's decisions shall be documented.~~

~~A description of the waste container contents shall be recorded on a data form as implemented in the site QAPjP. The description shall clearly identify all waste material parameters and provide enough information to estimate weights of waste material parameters. In cases where bags are not opened, a brief written description of the contents of the bags shall contain an estimate of the amount of each waste type in the bags. The written records of visual examination shall be supplemented with the audio/video recording.~~

B1-~~4~~5 Custody of Samples

Chain-of-Custody on field samples (including field QC samples) will be initiated immediately after sample collection or preparation. Sample custody will be maintained by ensuring that samples are custody sealed during shipment to the laboratory. After samples are accepted by the analytical laboratory, custody is maintained by assuring the samples are in the possession of an authorized individual, in that individual's view, in a sealed or locked container controlled by that individual, or in a secure controlled access location. Sample custody will be maintained until the sample is released by the site project manager or until the sample is expended. The Permittees shall require that site QAPjPs or site-specific procedures include a copy of the sample chain-of-custody form and instructions for completing sample chain-of-custody forms in a legally defensible manner. This form will include provisions for each of the following:

- Signature of individual initiating custody control, along with the date and time.

- Documentation of sample numbers for each sample under custody. Sample numbers will be referenced to a specific sampling event description that will identify the sampler(s) through signature, the date and time of sample collection, type/number containers for each sample, sample matrix, preservatives (if applicable), requested methods of analysis, place/address of sample collection and the waste container number.

- For off-site shipping, method of shipping transfer, responsible shipping organization or corporation, and associated air bill or lading number.

- Signatures of custodians relinquishing and receiving custody, along with date and time of the transfer.

- Description of final sample container disposition, along with signature of individual removing sample container from custody.

- Comment section.

- Documentation of discrepancies, breakage or tampering.

All samples and sampling equipment will be identified with unique identification numbers. Sampling Coring tools and equipment will be identified with unique equipment numbers to ensure that all sampling equipment, coring tools, and sampling canisters are traceable to equipment cleaning batches.

All samples will be uniquely identified to ensure the integrity of the sample and can be used to identify the generator/storage site and date of collection. Sample tags or labels will be affixed to all samples and will identify at a minimum:

- Sample ID number
- Sampler initials and organization
- Ambient temperature and pressure (for gas samples only)
- Sample description
- Requested analyses
- Data and time of collection
- QC designation (if applicable)

B1-~~5~~6 Sample Packing and Shipping

In the event that the analytical facilities are not at the generator/storage site, the samples shall be packaged and shipped to an off-site laboratory. Sample containers shall be packed to prevent any damage to the sampling container and maintain the preservation temperature, if necessary. Department of Transportation (**DOT**) regulations shall be adhered to for shipment of the package.

When preparing SUMMA® or equivalent canisters for shipment, special care shall be taken with the pressure gauge and the associated connections. Metal boxes which have separate compartments, or cardboard boxes with foam inserts are standard shipping containers. The chosen shipping container shall meet selected DOT regulations. If temperatures shall be maintained, an adequate number of cold packs necessary to maintain the preservation temperature shall be added to the package.

Glass jars are wrapped in bubble wrap or another type of protection. The wrapped jar should be placed in a plastic bag inside of the shipping container, so that if the jar breaks, the inside of the shipping container and the other samples will not be contaminated. The plastic bag will enable the receiving analytical lab to prevent contamination of their shipping and receiving area. Plastic jars do not present a problem for shipping purposes. All shipping containers will contain appropriate blank samples to detect any VOC cross-contamination. A DOT approved cooler, or similar package may be used as the shipping container. If temperatures must be maintained, an adequate number of cold packs necessary to maintain the preservation temperature shall be added to the package. If fill material is needed, compatibility between the samples and the fill should be evaluated prior to use.

All sample containers should be affixed with signed tamper-proof seals or devices so that it is apparent if the sample integrity has been compromised and that the identity of the seal or device is traceable to the individual who affixed the seal. A seal should also be placed on the outside of the shipping container for the same reason. Sample custody documentation shall be placed inside the sealed or locked shipping container, with the current custodian signing to release custody. Transfer of custody is completed when the receiving custodian opens the shipping container and signs the custody documentation. The shipping documentation will serve to track the physical transfer of samples between the two custodians.

A Uniform Hazardous Waste Manifest is not required, since samples are exempted from the definition of hazardous waste under RCRA. All other shipping documentation specified in the site specific SOP for sample shipment (i.e., bill of lading, site-specific shipping documentation) is required.

B1-~~6~~7 List of References

Bechtel BWXT Idaho, LLC (BWXT), 2000, Determination of Drum Age Criteria and Prediction Factors Based on Packaging Configurations, INEEL/EXT-2000-01207, October 2000, Liekhus, K.J., S.M. Djordjevic, M. Devarakonda, and M.J. Connolly, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho.

Lockheed Idaho Technologies Company, 1995, Position for Determining Gas Phase Volatile Organic Compound Concentrations in Transuranic Waste Containers, INEL-95/0109/Revision 1, M.J. Connolly, et. al.

U.S. Environmental Protection Agency (EPA), 1988, "Compendium Method TO-14, The Determination of Volatile Organic Compounds (VOC) in Ambient Air Using SUMMA Passivated Canister Sampling and Gas Chromatographic Analyses." Compendium of Methods for Determination of Toxic Organic Compounds in Ambient Air. Research Triangle Park , North Carolina, Quality Assurance Division, Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency.

U.S. Environmental Protection Agency (EPA), 1996. Test Methods for Evaluating Solid Waste, “Laboratory Manual Physical/Chemical Methods, SW-846, 3rd ed., U.S. EPA, OSW and ER, Washington D.C.

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TABLES

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TABLE B1-1

GAS SAMPLE REQUIREMENTS

Parameter	Container[a]	Minimum Drum Headspace Sample Volume[b]	Holding Temperatures
VOCs	SUMMA® Canister	250 ml	0-40 ºC

[a] Alternately, canisters that meet QAOs may be used.
[b] Alternatively, if available headspace is limited, a single 100 ml sample may be collected for determination of VOCs.

TABLE B1-2
SUMMARY OF DRUM FIELD QC HEADSPACE SAMPLE FREQUENCIES

QC Samples	Manifold	Direct Canister	On-Line Systems
Field blanks[a]	1 per sampling batch[d]	1 per sampling batch[d]	1 per on-line batch[f]
Equipment blanks[b]	1 per sampling batch[d]	once[e]	1 per on-line batch[f]
Field reference standards[c]	1 per sampling batch[d]	once[e]	1 per on-line batch[f]
Field duplicates	1 per sampling batch[d]	1 per sampling batch[d]	1 per on-line batch[f]

[a] Analysis of field blanks for VOCs (Table B3-2 of Appendix B3), only, is required. For on-line integrated sampling/analysis systems, if field blank results meet the acceptance criterion, a separate on-line blank is not required.

[b] One equipment blank or on-line sample shall be collected, analyzed for VOCs (Table B3-2), and demonstrated clean prior to first use of the headspace gas sampling equipment with each of the sampling heads, then at the specified frequency, for VOCs only thereafter. Daily, prior to work, the sampling manifold, if in use, shall be verified clean using an OVA.

[c] One field reference standard or on-line control sample shall be collected, analyzed, and demonstrated to meet the QAOs specified in Permit Attachment B3 prior to first use, then at the specified frequency thereafter.

[d] A sampling batch is a suite of samples collected consecutively using the same sampling equipment within a specific time period. A sampling batch can be up to 20 samples (excluding field QC samples), all of which shall be collected within 14 days of the first sample in the batch.

[e] One equipment blank and field reference standard shall be collected after equipment purchase, cleaning, and assembly.

[f] An on-line batch is the number of samples collected within a 12-hour period using the same on-line integrated sampling/analysis system. The analytical batch requirements are specified by the analytical method being used in the on-line system.

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

TABLE B1-4
SAMPLE HANDLING REQUIREMENTS FOR HOMOGENEOUS SOLIDS AND SOIL/GRAVEL

Parameter	Suggested Quantity [a]	Required Preservative	Suggested Container	Maximum Holding Time [b]
VOCs	15 grams	Cool to 4ºC	Glass Vial [c]	14 Days Prep/ 40 Days Analyze [d]
SVOCs	50 grams	Cool to 4ºC	Glass Jar [e]	14 Days Prep/ 40 Days Analyze [d]
Metals	10 grams	Cool to 4ºC	Plastic Jar [f]	180 Days [g]

[a] Quantity may be increased or decreased according to the requirements of the analytical laboratory, as long as the QAOs are met.
[b] Holding time begins at sample collection (holding times are consistent with SW-846 requirements).
[c] 40-ml VOA vial or other appropriate containers shall have an airtight cap.
[d] 40-day holding time allowable only for methanol extract - 14-day holding time for non-extracted VOCs.
[e] Appropriate containers should be used and should have Teflon® lined caps.
[f] Polyethylene or polypropylene preferred, glass jar is allowable.
[g] Holding time for mercury analysis is 28 days.

Note: Preservation requirements in the most recent version of SW-846 may be used if appropriate.

TABLE B1-5
HEADSPACE GAS DRUM AGE CRITERIA SAMPLING SCENARIOS

Scenario	Description
1	A. Unvented 55-gallon drums without rigid poly liners are sampled through the drum lid at the time of venting. B1. Unvented 55-gallon drums with unvented rigid poly liners are sampled through the rigid poly liner at the time of venting or prior to venting. B2. Vented 55-gallon drums with unvented rigid poly liners are sampled through the rigid poly liner at the time of venting or prior to venting. C. Unvented 55-gallon drums with vented rigid poly liners are sampled through the drum lid at the time of venting.
2	55-gallon drums that have met the criteria for Scenario 1 and then are vented, but not sampled at the time of venting. [a]
3	Containers (i.e., 55-gallon drums, 85-gallon drums, 100-gallon drums, SWBs, TDOPs, and pipe components) that are initially packaged in a vented condition and sampled in the container headspace and containers that are not sampled under Scenario 1 or 2.

[a] Containers that have not met the Scenario 1 DAC at the time of venting must be categorized under Scenario 3. This requires the additional information required of each container in Scenario 3 (i.e., determination of packaging configuration), and such containers can only be sampled after meeting the appropriate Scenario 3 DAC.

TABLE B1-6
SCENARIO 1 DRUM AGE CRITERIA (in days) MATRIX

Summary Category Group	DAC (days)
~~S3000/S4000~~	~~127~~
S5000	53

Note: Containers that are sampled using the Scenario 1 DAC do not require information on the packaging configuration because the Scenario 1 DAC are based on a bounding packaging configuration. In addition, information on the rigid liner vent hole presence and diameter do not apply to containers that are sampled using the Scenario 1 DAC because they are unvented prior to sampling.

TABLE B1-7
SCENARIO 2 DRUM AGE CRITERIA (in days) MATRIX

	~~Summary Category Group S3000/S4000~~				Summary Category Group S5000			
Filter H_2 Diffusivity [a]	~~**Rigid Liner Vent Hole Diameter (in)**~~ [b]				**Rigid Liner Vent Hole Diameter (in)** [b]			
(mol/s/mod fraction)	~~0.30~~	~~0.375~~	~~0.75~~	~~1.0~~	0.30	0.375	0.75	1.0
1.9×10^{-6}	~~36~~	~~30~~	~~23~~	~~22~~	29	22	13	12
3.7×10^{-6}	~~30~~	~~25~~	~~19~~	~~18~~	25	20	12	11
3.7×10^{-5}	~~13~~	~~11~~	~~11~~	~~11~~	7	6	6	4

[a] The documented filter H_2 diffusivity must be greater than or equal to the listed value to use the DAC for the listed filter H_2 diffusivity (e.g., a container with a filter H_2 diffusivity of 4.2×10^{-6} must use a DAC for a filter with a 3.7×10^{-6} filter H_2 diffusivity). If a filter H_2 diffusivity for a container is undocumented or unknown or is less than 1.9×10^{-6} filter H_2 diffusivity, a filter of known H_2 diffusivity that is greater than or equal to 1.9×10^{-6} filter H_2 diffusivity must be installed prior to initiation of the relevant DAC period.

[b] The documented rigid liner vent hole diameter must be greater than or equal to the listed value to use the DAC for the listed rigid liner vent hole diameter (e.g., a container with a rigid liner vent hole of 0.5 in. must use a DAC for a rigid liner vent hole of 0.375 in.). If the rigid liner vent hole diameter for a container is undocumented during packaging (Attachment B, Section B-3~~(d)~~(1)), repackaging (Attachment B, Section B-3~~(d)~~(1)), and/or venting (Section B1-1a[~~6~~4][ii]), that container must use a DAC for a rigid liner vent hole diameter of 0.30 in.

Note: Containers that are sampled using the Scenario 2 DAC do not require information on the packaging configuration because the Scenario 2 DAC are based on a bounding packaging configuration.

TABLE B1-8
SCENARIO 3 PACKAGING CONFIGURATION GROUPS

Packaging Configuration Group	~~**Covered S3000/S4000 Packaging Configuration Groups**~~	**Covered S5000 Packaging Configuration Groups**
Packaging Configuration Group 1, 55-gal drums [a]	• ~~No layers of confinement, filtered inner lid [b]~~ • ~~No inner bags, no liner bags (bounding case)~~	• No layers of confinement, filtered inner lid [b] • No inner bags, no liner bags (bounding case)
Packaging Configuration Group 2, 55-gal drums [a]	• ~~1 inner bag~~ • ~~1 filtered inner bag~~ • ~~1 liner bag (bounding case)~~ • ~~1 filtered liner bag~~	• 1 inner bag • 1 filtered inner bag • 1 liner bag • 1 filtered liner bag • 1 inner bag, 1 liner bag • 1 filtered inner bag, 1 filtered liner bag • 2 inner bags • 2 filtered inner bags • 2 inner bags, 1 liner bag • 2 filtered inner bags, 1 filtered liner bag • 3 inner bags • 3 filtered inner bags • 3 filtered inner bags, 1 filtered liner bag • 3 inner bags, 1 liner bag (bounding case)
Packaging Configuration Group 3, 55-gal drums [a]	• ~~1 inner bag, 1 liner bag~~ • ~~1 filtered inner bag, 1 filtered liner bag~~ • ~~2 inner bags~~ • ~~2 filtered inner bags~~ • ~~2 liner bags (bounding case)~~ • ~~2 filtered liner bags~~	• 2 liner bags • 2 filtered liner bags • 1 inner bag, 2 liner bags • 1 filtered inner bag, 2 filtered liner bags • 2 inner bags, 2 liner bags • 2 filtered inner bags, 2 filtered liner bags • 3 filtered inner bags, 2 filtered liner bags • 4 inner bags • 3 inner bags, 2 liner bags • 4 inner bags, 2 liner bags (bounding case)

Packaging Configuration Group 4, pipe components	• ~~No layers of confinement inside a pipe component~~ • ~~1 filtered inner bag, 1 filtered metal can inside a pipe component~~ • ~~2 inner bags inside a pipe component~~ • ~~2 filtered inner bags inside a pipe component~~ • ~~2 filtered inner bags, 1 filtered metal can inside a pipe component~~ • ~~2 inner bags, 1 filtered metal can inside a pipe component (bounding case)~~	• No layers of confinement inside a pipe component • 1 filtered inner bag, 1 filtered metal can inside a pipe component • 2 inner bags inside a pipe component • 2 filtered inner bags inside a pipe component • 2 filtered inner bags, 1 filtered metal can inside a pipe component • 2 inner bags, 1 filtered metal can inside a pipe component (bounding case)
Packaging Configuration Group 5, Standard Waste Box or Ten-Drum Overpack [a]	• ~~No layers of confinement~~ • ~~1 SWB liner bag (bounding case)~~	• No layers of confinement • 1 SWB liner bag (bounding case)
Packaging Configuration Group 6, Standard Waste Box or Ten-Drum Overpack [a]	• ~~any combination of inner and/or liner bags that is less than or equal to 6~~ • ~~5 inner bags, 1 SWB liner bag (bounding case)~~	• any combination of inner and/or liner bags that is less than or equal to 6 • 5 inner bags, 1 SWB liner bag (bounding case)
Packaging Configuration Group 7, 85-gal. drums and 100-gal. drums [a]	• ~~No inner bags, no liner bags, no rigid liner, filtered inner lid (bounding case) [b]~~ • ~~No inner bags, no liner bags, no rigid liner~~	• No inner bags, no liner bags, no rigid liner, filtered inner lid (bounding case) [b] • No inner bags, no liner bags, no rigid liner
Packaging Configuration Group 8, 85-gal. drums and 100-gal. drums [a]	• ~~4 inner bags and 2 liner bags, no rigid liner, filtered inner lid (bounding case) [b]~~	• 4 inner bags and 2 liner bags, no rigid liner, filtered inner lid (bounding case) [b]

[a] If a specific Packaging Configuration Groups cannot be determined based on the data collected during packaging ~~(Attachment B, Section B-3(d)1)~~ and/or repackaging ~~(Attachment B, Section B-3(d)1)~~, a conservative default Packaging Configuration Group of 3 for 55-gallon drums, 6 for SWBs and TDOPs, and 8 for 85-gallon and 100-gallon drums must be assigned provided the drums do not contain pipe component packaging. If pipe components are present as packaging in the drums, the pipe components must be sampled following the requirements for Packaging Configuration Group 4.

[b] A “filtered inner lid” is the inner lid on a double lid drum that contains a filter.

Definitions:

Liner Bags: One or more optional plastic bags that are used to control radiological contamination. Liner bags for drums have a thickness of approximately 11 mils. Liner bags are typically similar in size to the container. SWB liner bags have a thickness of approximately 14 mils. TDOPs use SWB liner bags.

Inner Bags: One or more optional plastic bags that are used to control radiological contamination. Inner bags have a thickness of approximately 5 mils and are typically smaller than liner bags.

TABLE B1-9
SCENARIO 3 DRUM AGE CRITERIA (in days) MATRIX FOR S5000 WASTE BY PACKAGING CONFIGURATION GROUP

Packaging Configuration Group 1

Filter H_2 Diffusivity [a] (mol/s/mol fraction)	Rigid Liner Vent Hole Diameter [b]				No Liner Lid	No Liner
	0.3-inch Diameter Hole	0.375-inch Diameter Hole	0.75-inch Diameter Hole	1-inch Diameter Hole		
1.9×10^{-6}	131	95	37	24	4	4
3.7×10^{-6}	111	85	36	24	4	4
3.7×10^{-5}	28	28	23	19	4	4

Packaging Configuration Group 2

Filter H_2 Diffusivity [a] (mol/s/mol fraction)	Rigid Liner Vent Hole Diameter [b]				No Liner Lid	No Liner
	0.3-inch Diameter Hole	0.375-inch Diameter Hole	0.75-inch Diameter Hole	1-inch Diameter Hole		
1.9×10^{-6}	175	138	75	60	30	11
3.7×10^{-6}	152	126	73	59	30	11
3.7×10^{-5}	58	57	52	47	28	8

Packaging Configuration Group 3

Filter H_2 Diffusivity [a] (mol/s/mol fraction)	Rigid Liner Vent Hole Diameter [b]				No Liner Lid	No Liner
	0.3-inch Diameter Hole	0.375-inch Diameter Hole	0.75-inch Diameter Hole	1-inch Diameter Hole		
1.9×10^{-6}	199	161	96	80	46	16
3.7×10^{-6}	175	148	93	79	46	16
3.7×10^{-5}	72	72	67	62	42	10

Packaging Configuration Group 4	
Filter H_2 Diffusivity [a] (mol/s/mol fraction)	Headspace Sample Taken Inside Pipe Component
> 1.9×10^{-6}	152

Packaging Configuration Group 5	
Filter H_2 Diffusivity [a, c] (mol/s/mol fraction)	Headspace Sample Taken Inside SWB/TDOP
> 7.4×10^{-6} (SWB)	15
3.33×10^{-5} (TDOP)	15

Packaging Configuration Group 6	
Filter H_2 Diffusivity [a, c] (mol/s/mol fraction)	Headspace Sample Taken Inside SWB/TDOP
> 7.4×10^{-6} (SWB)	56
3.33×10^{-5} (TDOP)	56

Packaging Configuration Group 7 [d]			
Filter H_2 Diffusivity [a] (mol/s/mol fraction)	Inner Lid Filter Vent Minimum H_2 Diffusivity (mol/s/mol fraction) [a]		
	7.4×10^{-6}	1.85×10^{-5}	9.25×10^{-5} [e]
3.7×10^{-6}	13	7	2
7.4×10^{-6}	10	6	2
1.85×10^{-5}	6	4	2

Packaging Configuration Group 8	
Filter H_2 Diffusivity [a] (mol/s/mol fraction)	Inner Lid Filter Vent Minimum H_2 Diffusivity (mol/s/mol fraction)
	7.4×10^{-6}
3.7×10^{-6}	21

[a] The documented filter H_2 diffusivity must be greater than or equal to the listed value to use the DAC for the listed filter H_2 diffusivity (e.g., a container with a filter H_2 diffusivity of 4.2×10^{-6} must use a DAC for a filter with a 3.7×10^{-6} filter H_2 diffusivity). If a filter H_2 diffusivity for a container is undocumented or unknown or is less than 1.9×10^{-6} filter H_2 diffusivity, a filter of known H_2 diffusivity that is greater than or equal to 1.9×10^{-6} filter H_2 diffusivity must be installed prior to initiation of the relevant DAC period.

[b] The documented rigid liner vent hole diameter must be greater than or equal to the listed value to use the DAC for the listed rigid liner vent hole diameter (e.g., a container with a rigid liner vent hole of 0.5 in.

must use a DAC for a rigid liner vent hole of 0.375 in.). If the rigid liner vent hole diameter for a container is undocumented during packaging~~ (Attachment B, Section B-3(d)1)~~, repackaging~~ (Attachment B, Section B-3(d)1)~~, and/or venting (Section B1-1a[~~6~~4][ii]), that container must use a DAC for a rigid liner vent hole diameter of 0.30 in.

[c] The filter H_2 diffusivity for SWBs or TDOPs is the sum of the diffusivities for all of the filters on the container because SWBs and TDOPs have more than 1 filter.

[d] Headspace sample taken between inner and outer drum lids. If headspace sample is taken inside the filtered inner drum lid prior to placement of the outer drum lid, then a DAC value of 2 days may be used. Footnote e is also applicable. Packaging Configuration Group 7 DAC values apply to drums with up to two lids.

[e] While a DAC value of 2 days may be determined, containers must comply with the equilibrium requirements specified in Section B1-1a (i.e., 72 hours at 18°C or higher). The equilibrium requirement for headspace gas sampling shall be met separately.

~~TABLE B1-10~~
~~SCENARIO 3 DRUM AGE CRITERIA (in days) MATRIX FOR S3000 AND S4000 WASTE BY PACKAGING CONFIGURATION GROUP~~

~~Packaging Configuration Group 1~~						
~~Filter H_2 Diffusivity~~ [a] ~~(mol/s/mol fraction)~~	~~Rigid Liner Vent Hole Diameter~~ [b]				~~No Liner Lid~~	~~No Liner~~
	~~0.3-inch Diameter Hole~~	~~0.375-inch Diameter Hole~~	~~0.75-inch Diameter Hole~~	~~1-inch Diameter Hole~~		
~~1.9×10^{-6}~~	~~131~~	~~95~~	~~37~~	~~24~~	~~4~~	~~4~~
~~3.7×10^{-6}~~	~~111~~	~~85~~	~~36~~	~~24~~	~~4~~	~~4~~
~~3.7×10^{-5}~~	~~28~~	~~28~~	~~23~~	~~19~~	~~4~~	~~4~~

~~Packaging Configuration Group 2~~						
~~Filter H_2 Diffusivity~~ [a] ~~(mol/s/mol fraction)~~	~~Rigid Liner Vent Hole Diameter~~ [b]				~~No Liner Lid~~	~~No Liner~~
	~~0.3-inch Diameter Hole~~	~~0.375-inch Diameter Hole~~	~~0.75-inch Diameter Hole~~	~~1-inch Diameter Hole~~		
~~1.9×10^{-6}~~	~~213~~	~~175~~	~~108~~	~~92~~	~~56~~	~~18~~
~~3.7×10^{-6}~~	~~188~~	~~161~~	~~105~~	~~90~~	~~56~~	~~17~~
~~3.7×10^{-5}~~	~~80~~	~~80~~	~~75~~	~~71~~	~~49~~	~~10~~

~~Packaging Configuration Group 3~~						
~~Filter H_2 Diffusivity~~ [a] ~~(mol/s/mol fraction)~~	~~Rigid Liner Vent Hole Diameter~~ [b]				~~No Liner Lid~~	~~No Liner~~
	~~0.3-inch Diameter Hole~~	~~0.375-inch Diameter Hole~~	~~0.75-inch Diameter Hole~~	~~1-inch Diameter Hole~~		
~~1.9×10^{-6}~~	~~283~~	~~243~~	~~171~~	~~154~~	~~107~~	~~34~~
~~3.7×10^{-6}~~	~~253~~	~~225~~	~~166~~	~~151~~	~~106~~	~~31~~
~~3.7×10^{-5}~~	~~121~~	~~121~~	~~115~~	~~110~~	~~84~~	~~13~~

~~Packaging Configuration Group 4~~	
~~Filter H_2 Diffusivity~~ [a] ~~(mol/s/mol fraction)~~	~~Headspace Sample Taken Inside Pipe Component~~
~~$\geq 1.9 \times 10^{-6}$~~	~~152~~

~~Packaging Configuration Group 5~~	
~~Filter H_2 Diffusivity~~ [a, c] ~~(mol/s/mol fraction)~~	~~Headspace Sample Taken Inside SWB/TDOP~~
~~$\geq 7.4 \times 10^{-6}$ (SWB)~~	~~15~~
~~3.33×10^{-5} (TDOP)~~	~~15~~

~~Packaging Configuration Group 6~~	
~~Filter H_2 Diffusivity~~ [a, c] ~~(mol/s/mol fraction)~~	~~Headspace Sample Taken Inside SWB/TDOP~~
~~$\geq 7.4 \times 10^{-6}$ (SWB)~~	~~56~~
~~3.33×10^{-5} (TDOP)~~	~~56~~

~~Packaging Configuration Group 7~~ [d]			
~~Filter H_2 Diffusivity~~ [a] ~~(mol/s/mol fraction)~~	~~Inner Lid Filter Vent Minimum H_2 Diffusivity (mol/s/mol fraction)~~ [a]		
	~~7.4×10^{-6}~~	~~1.85×10^{-5}~~	~~9.25×10^{-5}~~ [e]
~~3.7×10^{-6}~~	~~13~~	~~7~~	~~2~~
~~7.4×10^{-6}~~	~~10~~	~~6~~	~~2~~
~~1.85×10^{-5}~~	~~6~~	~~4~~	~~2~~

~~Packaging Configuration Group 8~~	
~~Filter H_2 Diffusivity~~ [a] ~~(mol/s/mol fraction)~~	~~Inner Lid Filter Vent Minimum H_2 Diffusivity (mol/s/mol fraction)~~
	~~7.4×10^{-6}~~
~~3.7×10^{-6}~~	~~21~~

~~[a] The documented filter H_2 diffusivity must be greater than or equal to the listed value to use the DAC for the listed filter H_2 diffusivity (e.g., a container with a filter H_2 diffusivity of 4.2×10^{-6} must use a DAC for a filter with a 3.7×10^{-6} filter H_2 diffusivity). If a filter H_2 diffusivity for a container is undocumented or unknown or is less than 1.9×10^{-6} filter H_2 diffusivity, a filter of known H_2 diffusivity that is greater than or equal to 1.9×10^{-6} filter H_2 diffusivity must be installed prior to initiation of the relevant DAC period.~~

~~[b] The documented rigid liner vent hole diameter must be greater than or equal to the listed value to use the DAC for the listed rigid liner vent hole diameter (e.g., a container with a rigid liner vent hole of 0.5. in must use a DAC for a rigid liner vent hole of 0.375 in.). If the rigid liner vent hole diameter for a container is undocumented during packaging (Attachment B, Section B-3(d)1), repackaging (Attachment B, Section B-3(d)1), and/or venting (Section B1-1a[6][ii]), that container must use a DAC for a rigid liner vent hole diameter of 0.30 in.~~

~~[c] The filter H_2 diffusivity for SWBs or TDOPs is the sum of the diffusivities for all of the filters on the container because SWBs and TDOPs have more than 1 filter.~~

~~[d] Headspace sample taken between inner and outer drum lids. If headspace sample is taken inside the filtered inner drum lid prior to placement of the outer drum lid, then a DAC value of 2 days may be used. Footnote e is also applicable. Packaging Configuration Group 7 DAC values apply to drums with up to two lids.~~

~~[e] While a DAC value of 2 days may be determined, containers must comply with the equilibrium requirements specified in Section B1-1a (i.e., 72 hours at 18°C or higher). The equilibrium requirement for headspace gas sampling shall be met separately.~~

FIGURES

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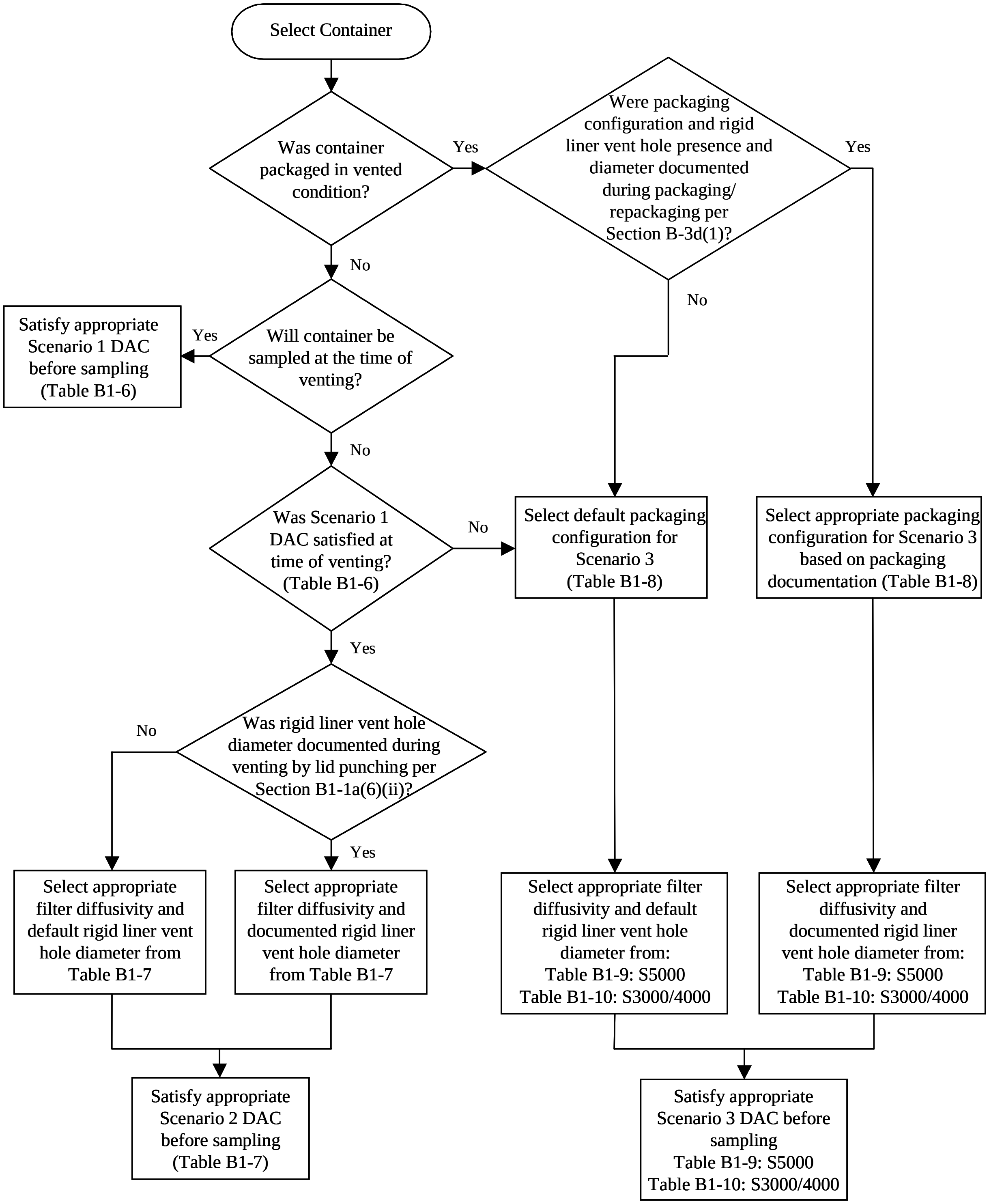

Figure B1-1
Headspace Gas Drum Age Criteria Sampling Scenario Selection Process

Figure B1-2
Headspace Sampling Manifold

Figure B1-3
SUMMA® Canister Components Configuration (Not to Scale)

Figure B1-4
Schematic Diagram of Direct Canister with the Poly Bag Sampling Head

Figure B1-5
Rotational Coring Tool (Light Weight Auger)

Figure B1-6
Non-Rotational Coring Tool (Thin Walled Sampler)

~~Figure B1-7~~
~~Overall Programmatic Approach to Visual Examination~~

ATTACHMENT B2

STATISTICAL METHODS USED IN SAMPLING AND ANALYSIS

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ATTACHMENT B2

STATISTICAL METHODS USED IN SAMPLING AND ANALYSIS

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ATTACHMENT B2

STATISTICAL METHODS USED IN SAMPLING AND ANALYSIS

Introduction

The Permittees shall require generator/storage sites (**sites**) to use the following statistical methods for sampling and analysis of TRU mixed waste which is managed, stored, or disposed at WIPP, unless determined unnecessary by the Permittees as a result of an Acceptable Knowledge (AK) Sufficiency Determination. These statistical methods include methods for selecting ~~waste containers for visual inspection, selecting retrievably stored~~ waste containers for totals analysis, selecting waste containers for headspace gas sampling and analysis, and setting the upper confidence limit~~, and control charting for newly generated waste stream sampling~~.

~~B2-1 Approach for Statistically Selecting Waste Containers for Visual Examination~~

~~As a Quality Control check on the radiographic examination of waste containers, a statistically selected portion of the certified waste containers must be opened and visually examined. The data from visual examination shall be used to verify the matrix parameter category, waste material parameter weights, and absence of prohibited items as identified in Attachment B, Section B-1C, as determined by radiography.~~

~~The data obtained from the visual examination shall also be used to determine, with acceptable confidence, the percentage of miscertified waste containers from the radiographic examination. Miscertified containers are those that radiography indicates meet the Waste Isolation Pilot Plant Waste Acceptance Criteria and Transuranic Package Transporter-II Authorized Methods for Payload Control but visual examination indicates do not meet these criteria.~~

~~Participating sites shall initially use an eleven-percent (11%) miscertification rate to calculate the number of waste containers that shall be visually examined until a site-specific miscertification rate has been established. Sites may establish a site-specific miscertification rate by characterizing a lot of no less than fifty containers in a single Summary Category Group at the initial 11% miscertification rate. The results of this initial characterization shall then serve as the site-specific miscertification rate until reassessed annually as described below.~~

~~The site-specific miscertification rate shall be applied initially to each Summary Category Group to determine the number of containers in that Summary Category Group requiring visual examination, as specified in Table B2-1. However, a Summary Category Group-specific miscertification rate shall be determined when either six months have passed since radiographic characterization commenced on a given Summary Category Group, or at least 50% of a given Summary Category Group has undergone radiographic characterization, whichever occurs first. The Summary Category Group shall then be subject to the visual examination requirements of this reevaluated Summary Category Group-specific miscertification rate to ensure that the entire Summary Category Group is appropriately characterized. Table B2-1 provides the number of waste containers per Summary Category Group that shall be visually examined for various~~

~~miscertification rates and waste container population sizes using a hypergeometric sampling approach. Sites shall use a miscertification rate of 1% for any Summary Category Group-specific miscertification rate calculated to be less than 1%.~~

~~The site-specific miscertification rate shall be reassessed annually by calculating a drum-weighted average of all historic Summary Category Group-specific miscertification rates. Each Summary Category Group-specific miscertification rate shall be rounded off to the nearest integer value before being used to calculate the new site-specific miscertification rate. Sites shall use a miscertification rate of 1% for any site-specific miscertification rate calculated to be less than 1%.~~

~~Table B2-1 has been developed with the use of an EG&G Idaho, Inc. engineering design file (EG&G 1994). The number of waste containers requiring visual examination is based on a 90 percent confidence that the actual miscertification rate (for the population) is less than the 90 percent upper confidence level (**UCL**), and also an 80 percent confidence that the UCL will be less than 14 percent if the actual miscertification rate is the same as the targeted percent of miscertified waste containers (column heading of Table B2-1). Thus, there is only a 10 percent probability that the UCL will be below 14 percent in the case where the actual miscertification rate is 14 percent or greater. Also, there is only a 20 percent probability that the UCL will be above 14 percent in the case where the actual miscertification rate is the same as the targeted percent.~~

~~The hypergeometric approach to determining the number of containers to be visually examined is dependant upon the defined estimate of the allowable proportion of containers that were miscertified and information on previous percentages of containers that were miscertified. The rationale and details of this methodology are discussed below.~~

~~In a population of size N, there are M miscertified containers, so the true proportion of the miscertified containers in the population is M/N = p_{true}. Since p_{true} (or M) is not known, p_{true} shall be estimated by randomly sampling some of the containers. If in a sample of n containers, x are found to be miscertified, the sample estimate ($\hat{p}$) of the true population proportion p_{true} is:~~

$$\hat{p} = \frac{x}{n} \qquad \text{(B2-1)}$$

~~This value is only an estimate, and as a result has some uncertainty associated with it. This uncertainty shall be quantified by calculating the upper one-sided ($1-\alpha$) percent confidence limit for p, defined as p_{UCL}. This confidence limit gives the largest value the true proportion could take on and still have a “reasonable” chance (e.g., an α = 0.10 probability) of producing x miscertified containers in a sample of n out of N. This upper confidence limit is calculated as:~~

$$p_{UCL} = \frac{M_{UCL}}{N} \qquad \text{(B2-2)}$$

~~where M_{UCL} is the smallest value of M such that the probability of observing x or fewer miscertified containers in a sample of size n is less than or equal to ". That is, it is the smallest value of M such that the following inequality is true:~~

$$\sum_{k=0}^{x} \frac{\binom{M}{k}\binom{N-M}{n-k}}{\binom{N}{n}} \leq \alpha \qquad \text{(B2-3)}$$

~~where each term in parentheses has the usual combinatorial interpretation. For example:~~

$$\binom{M}{k} = \frac{M!}{k!\,(M-k)!} \qquad \text{(B2-4)}$$

~~Each term in the sum in Equation B2-3 is the hypergeometric probability of observing k miscertified containers in a sample size n from a population of size N in which there are M miscertified containers (and hence the population proportion of miscertified containers is p =M/N). The value M_{UCL} is obtained by substituting different values for M into Equation B2-3 until the largest value satisfying the inequality is found.~~

~~Note that in Equation B2-3, the upper confidence limit is dependent on x, the number of miscertifications observed in the sample, as well as on n, the sample size. To obtain the required sample size, the values of x that are likely to be seen shall also need to be considered. Sample size that shall be visually examined shall be determined by setting a desired upper confidence limit value and then manipulating x and n in Equation B2-3.~~

B2-~~2~~1 Approach for Selecting Waste Containers for Statistical Sampling

B2-~~2~~1a Statistical Selection of Containers for Totals Analysis

The statistical approach for characterizing retrievably stored and newly generated homogeneous solids (S3000) and soil/gravel (S4000) waste and repackaged or treated S3000 waste ~~that the generator/storage site demonstrates is not suitable for control charting using sampling and analysis~~ relies on using acceptable knowledge to segregate waste containers into relatively homogeneous waste streams. Using acceptable knowledge, generator/storage sites will classify the entire waste stream as hazardous or nonhazardous rather than individual waste containers. Individual waste containers serve as convenient units for characterizing the combined mass of waste from the waste stream of interest. Once segregated by waste stream, random selection and sampling of the waste containers followed by analysis of the waste samples shall be performed to ensure that the resulting mean contaminant concentration provides an unbiased representation of the true mean contaminant concentration for each waste stream. The Permittees shall require each site project manager to verify that the samples collected from within a waste stream were selected randomly.

An end use of analytical results for retrievably stored homogeneous solids and soil/gravel is for assigning the Environmental Protection Agency (**EPA**) hazardous waste numbers associated with toxicity characteristic waste (D-~~codes~~ numbers) that apply to each mixed waste stream ~~and to confirm acceptable knowledge~~. The toxicity characteristic D-~~codes~~ numbers are indicators that the waste exhibits the toxicity characteristic for specific contaminants under the Resource Conservation and Recovery Act (**RCRA**). The RCRA-toxicity determination is made on the basis of sampling and analysis of waste streams and on whether or not the waste stream includes F-~~code~~number wastes. If a waste stream includes one or more RCRA F-~~code~~numbers identified via acceptable knowledge, toxicity characteristic contaminants associated with the F-~~code~~number waste(s) are not included in the RCRA-toxicity characteristic determination. That is, the F-~~code~~numbers take precedence over RCRA-toxicity D-~~code~~number, and the waste stream is assumed hazardous regardless of the concentration. Therefore, toxicity characteristics contaminants associated with F-~~code~~numbers~~(s)~~ for a waste stream shall be omitted from all calculations for determining the number of containers to sample because these wastes streams are assumed to be hazardous. In addition, each toxicity characteristic contaminant associated with the F-~~code~~number(s) shall be excluded from evaluation of analytical results to determine D-~~codes~~numbers. Contaminants of interest for the sampling, analysis, and RCRA-toxicity determination of a waste stream, then, excludes contaminants associated with F-~~code~~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. ~~The preliminary estimates will be made by obtaining a preliminary number of samples from the waste stream or from previous sampling from the waste stream.~~ Preliminary estimates will be based on five samples selected randomly from the waste stream. If the entire waste stream is not available for sampling then five preliminary samples will be selected randomly from the available 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 ~~a minimum of 5 waste containers~~. 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:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad \text{(B2-5)}$$

$$s^2 = \frac{1}{n-1}\sum_{i=1}^{n} (x_i - \bar{x})^2 \qquad \text{(B2-6)}$$

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

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

$$n = \frac{t^2_{\alpha, n_0 - 1} s^2}{(RT - \bar{x})^2} \qquad \text{(B2-7)}$$

Where:

n_0 = the initial number of samples used to calculate the preliminary sample estimate.
n = the calculated number of samples in the preliminary estimate.
t^2 = the 90th percentile for a *t* distribution with n_0-1 degrees of freedom.
RT = 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 calculations should be rounded up to the nearest integer. A minimum of five containers shall be sampled and analyzed in each waste stream. If there are fewer than the minimum or required number of containers in a waste stream, one or more containers shall be sampled more than once to obtain the 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 available 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 available portion of the waste stream. A minimum of five randomly selected samples will be obtained and analyzed from the available 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 available 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, both the available and unavailable portions. 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 available 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, 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 available for sampling, 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. 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 ~~codes~~ 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~~1b Statistical Selection of Containers for Headspace Gas Analysis

~~If a waste stream meets the conditions for representative headspace gas sampling in Permit Attachment B, Section B-3a(1), headspace~~ Headspace gas sampling of ~~that~~ 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 10 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:

$$n_{voc_i} = \frac{t^2_{0.9,n-1} s^2_{e_{voc_i}}}{E^2_{voc_i}} \qquad \text{(B2-8)}$$

Where:

n_{voci} is the number of samples needed to representatively sample the waste stream for the VOC$_i$ from Table IV.D.1
s_{evoci} is the estimated standard deviation, based on the initial 10-samples, for VOC$_i$ from Table IV.D.1
E_{voci} is the allowable error determined as 1 percent of the limiting concentration for VOC$_i$ from Table IV.D.1

All calculations 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 than the minimum or required number of containers 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-~~3~~2b.

If only a portion of a waste stream is available 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 available portion of the waste stream. A minimum of ten randomly selected samples will be obtained and analyzed from the available 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 available 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, both the available and unavailable portions. 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 available 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, 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 available for sampling, 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. 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-~~3~~2 Upper Confidence Limits for Statistical Sampling

B2-~~3~~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:

$$n^* = \frac{t^2_{\alpha,n-1} s^2}{(RT - \bar{x})^2} \qquad \text{(B2-9)}$$

If the observed sample *n** estimate results in greater than 20 percent 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 continues until the difference between *n** and the previous sample determination is less than 20 percent.

Once sufficient sampling and analysis has occurred, the waste characterization will proceed. The assessment will be made with 90 percent confidence. The UCL_{90} for the mean concentration of each contaminant will be calculated in accordance with the following equation:

$$UCL_{90} = \bar{x} + \frac{t_{\alpha,n-1} s}{\sqrt{n}} \qquad \text{(B2-10)}$$

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 be assigned the hazardous waste ~~code~~ number for this contaminant. If the UCL_{90} is greater than or equal to the regulatory threshold limit, the waste stream will be assigned the hazardous waste ~~code~~ number for this contaminant.

B2-~~3~~2b Upper Confidence Limit for Statistical Headspace Gas Sampling

~~If a waste stream meets the conditions for representative headspace gas sampling in Attachment B, Section B-3a(1), a~~ 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:

$$n^* = \frac{t^2_{\alpha,n-1} s^2}{E^2} \tag{B2-11}$$

If the observed sample *n** estimate results in greater than 20 percent 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 continues until the difference between *n** and the previous sample determination is less than 20 percent. Then, the UCL_{90} is calculated using equation B2-10. In this case, UCL_{90} is the 90 percent upper confidence VOC concentration, $\bar{y}$ is the calculated mean VOC concentration and *s* is the standard deviation. The value of $t_{(\alpha,n-1)}$ is taken from Table 9-2 of Chapter 9 of ~~SW-846. The calculated UCL_{90} concentration for each headspace gas VOC will then be assigned to those containers in the waste stream not selected for headspace gas sampling. If the calculated UCL_{90} concentration is less than the applicable MDL, the MDL for the VOC will be assigned to each unsampled container instead of the UCL_{90} concentration.~~

~~B2-4 Control Charting for Newly Generated Waste Stream Sampling~~

~~For newly generated waste streams that the generator characterizes using control charts, significant process changes and process fluctuations associated with newly generated waste will be determined using statistical process control (**SPC**) charting techniques; these techniques require historical data for determining limits for indicator species, and subsequent periodic sampling to assess process behavior relative to historical limits. SPC will be performed on waste prior to solidification or packaging for ease of sampling. If the limits are exceeded for any toxicity characteristic parameter, the waste stream shall be recharacterized, and the characterization shall be performed according to procedures required in the WAP.~~

~~A Shewhart control chart (Gilbert, 1987) is a control chart for means that can be used for checking whether current data are consistent with past data and whether shifts or trends in means have occurred. The control chart for means is constructed of a center line and upper and lower control limits that are based on the mean and standard deviation of historical data for the process. If a current sample mean from the process lies within the limits, the process is said to be "in control", or consistent with historical data. If the current mean exceeds the limits, the process has likely changed from historical periods.~~

~~Logical sets of historical data to be used for the construction of limits in this application are the data from the initial characterization of the waste stream, if available, from characterization of a different lot of the waste stream, or from a retrievably stored waste stream of the same type from the same process. At a minimum, the logical set shall include ten representative sample values collected and analyzed from the newly generated waste stream. The data used for construction of the limits shall be justified. The underlying assumptions for control charts are that the data are independent and normally distributed with constant mean μ and constant variance σ^2. The statistical tests for normality shall be conducted and data transformation to normality performed, if necessary. Transformations shall take place prior to any calculations that use the data.~~

~~Each limit will be constructed such that there is a 90 percent confidence that the true mean does not exceed a limit. One-sided control limits are used because once a waste stream has been determined to be RCRA-hazardous, the limit exceedance of interest is on the lower side; that is when the process may become nonhazardous. Likewise, once a waste stream has been determined not to be RCRA-hazardous, the limit exceedance of interest is on the upper side; that is when the process may become RCRA-hazardous. Whether or not exceeding the limit would result in a change in the RCRA-hazardous nature of the waste stream depends on how close the observed control limits are to RCRA limits.~~

~~Current process data will be collected and averaged for comparison to the control limit for the mean. The collection period and number of samples to be included in the average are dependent on the waste stream characteristics. A small number of samples will reflect more of the process variability and there will potentially be more limit exceedance. If two or three samples are collected for the mean in the required annual (or batch) sampling of a relatively homogeneous waste stream, limit exceedances may not occur. If the waste stream is less homogeneous, it will be necessary to collect more samples to meet the required confidence limit.~~

~~Periodically it will be necessary to update the control limit for a process. An update is performed that includes all historical data if there is no evidence of a trend in the process or a shift in the mean for the process. If there has been a shift in the mean, only more recent data that reflects the shift is used. Control limits shall be based on at least ten data points that are representative of the process and do not exhibit outliers or a trend with time.~~

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~~TABLES~~

~~TABLE B2-1~~
~~NUMBER OF WASTE CONTAINERS REQUIRING VISUAL EXAMINATION~~

~~Annual Number of Waste Containers per Summary Category Group Undergoing Characterization~~	~~Number of Waste Containers Requiring Visual Examination Based on Percent of Waste Containers Miscertified to WIPP-WAC by Radiography in Previous Year(s)~~												
	~~1% or less~~	~~2%~~	~~3%~~	~~4%~~	~~5%~~	~~6%~~	~~7%~~	~~8%~~	~~9%~~	~~10%~~	~~11%~~	~~12%~~	~~13%~~	~~14% or greater~~
~~50 or less~~	~~22~~[a]	~~22~~	~~22~~[a]	~~22~~	~~29~~[a]	~~29~~	~~41~~[a]	~~41~~	~~46~~[a]	~~46~~	~~50~~[a]	~~50~~	~~50~~[a]	~~50~~
~~100~~	~~15~~	~~24~~	~~24~~	~~33~~	~~33~~	~~41~~	~~48~~	~~62~~	~~69~~	~~81~~	~~87~~	~~96~~	~~100~~	~~100~~
~~200~~	~~15~~	~~26~~	~~26~~	~~35~~	~~44~~	~~52~~	~~68~~	~~83~~	~~105~~	~~126~~	~~152~~	~~176~~	~~196~~	~~200~~
~~300~~	~~15~~	~~26~~	~~26~~	~~35~~	~~44~~	~~53~~	~~70~~	~~94~~	~~116~~	~~153~~	~~202~~	~~247~~	~~287~~	~~300~~
~~400~~	~~15~~	~~26~~	~~26~~	~~36~~	~~45~~	~~62~~	~~79~~	~~103~~	~~134~~	~~178~~	~~235~~	~~316~~	~~377~~	~~400~~
~~500~~	~~16~~	~~26~~	~~26~~	~~36~~	~~45~~	~~63~~	~~80~~	~~104~~	~~143~~	~~196~~	~~268~~	~~364~~	~~465~~	~~500~~
~~1000~~	~~16~~	~~27~~	~~27~~	~~36~~	~~46~~	~~64~~	~~81~~	~~114~~	~~162~~	~~239~~	~~359~~	~~568~~	~~848~~	~~1000~~
~~1500~~	~~16~~	~~27~~	~~27~~	~~37~~	~~46~~	~~64~~	~~81~~	~~123~~	~~171~~	~~257~~	~~416~~	~~701~~	~~1176~~	~~1500~~
~~2000~~	~~16~~	~~27~~	~~27~~	~~37~~	~~46~~	~~64~~	~~90~~	~~123~~	~~172~~	~~266~~	~~441~~	~~795~~	~~1453~~	~~2000~~

[a] ~~Number of containers for the higher even-number percent of miscertified containers is used because an odd percent implies a noninteger number of containers are likely to be miscertified.~~

FIGURES

Figure B2-1
~~Statistical~~ Approach ~~to~~ for Solid and Headspace Gas Sampling and Analysis ~~of Waste Streams of Retrievably Stored Homogeneous Solids and Solid/Gravel~~ to Obtain Additional Waste Characterization Information

ATTACHMENT B3

QUALITY ASSURANCE OBJECTIVES AND DATA VALIDATION TECHNIQUES FOR WASTE CHARACTERIZATION SAMPLING AND ANALYTICAL METHODS

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ATTACHMENT B3

QUALITY ASSURANCE OBJECTIVES AND DATA VALIDATION TECHNIQUES FOR WASTE CHARACTERIZATION SAMPLING AND ANALYTICAL METHODS

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ATTACHMENT B3
QUALITY ASSURANCE OBJECTIVES AND DATA VALIDATION TECHNIQUES FOR WASTE CHARACTERIZATION SAMPLING AND ANALYTICAL METHODS

B3-1 Validation Methods

The Permittees shall require the generator/storage sites (**sites**) to perform validation of all data (qualitative as well as quantitative) so that data used for Waste Isolation Pilot Plant (**WIPP**) compliance programs will be of known and acceptable quality. Validation includes a quantitative determination of precision, accuracy, completeness, and method detection limits (as appropriate) for analytical data (headspace Volatile Organics Compounds (**VOC**), total VOCs, Semivolatile Organic Compounds (**SVOC**), and metals data). Quantitative data validations shall be performed according to the conventional methods outlined below (equations B3-1 through B3-8). These quantitative determinations will be compared to the Quality Assurance Objectives (**QAOs**) specified in Sections B3-2 through B3-9. A qualitative determination of comparability and representativeness will also be performed.

The qualitative data or descriptive information generated by radiography and visual examination is not amenable to statistical data quality analysis. However, radiography and visual examination are complementary techniques yielding similar data for determining the waste matrix code and waste material parameter weights of waste present in a waste container. Therefore, visual examination results shall be used to verify the waste matrix code and waste material parameter weights determined by radiography. The waste matrix code is determined and waste material parameter weights are estimated to verify that the container is properly included in the appropriate waste stream.

Data validation will be used to assess the quality of waste characterization data collected based upon project precision, accuracy, completeness, comparability, and representativeness objectives. These objectives are described below:

Precision

Precision is a measure of the mutual agreement among multiple measurements of a single analyte, either by the same method or by different methods. Precision is either expressed as the relative percent difference (**RPD**) for duplicate measurements or as the percent relative standard deviation (**%RSD**) for three or more replicate measurements. For duplicate measurements, the precision expressed as the RPD is calculated as follows:

$$RPD = \frac{C_1 - C_2}{\frac{(C_1 + C_2)}{2}} \times 100 \qquad \text{(B3-1)}$$

where C_1 and C_2 are the two values obtained by analyzing the duplicate samples. C_1 is the larger of the two observed values.

For three or more replicate measurements, the precision expressed as the %RSD is calculated as follows:

$$\%RSD = \frac{s}{y_{mean}} \times 100 \qquad \text{(B3-2)}$$

where s is the standard deviation and y_{mean} is the mean of the replicate sample analyses.

The standard deviation, s, is calculated as follows:

$$s = \sqrt{\frac{\sum_{i=1}^{n}(y_i - y_{mean})^2}{n - 1}} \qquad \text{(B3-3)}$$

where y_i is the measured value of the *i*th replicate sample analysis measurement, and n equals the number of replicate analyses.

Another aspect of precision is associated with analytical equipment calibration. In these instances, the percent difference (**%D**) between multiple measurements of an equipment calibration standard shall be calculated as follows:

$$\%D = \frac{|C_1 - C_2|}{C_1} \times 100 \qquad \text{(B3-4)}$$

where C_1 is the initial measurement and C_2 is the second or other additional measurement.

<u>Accuracy</u>

Accuracy is the degree of agreement between a measured analyte concentration (or the average of replicate measurements of a single analyte concentration) and the true or known concentration. Accuracy is determined as the percent recovery (**%R**).

For situations where a standard reference material is used, the %R is calculated as follows:

$$\%R = \frac{C_m}{C_{srm}} \times 100 \qquad \text{(B3-5)}$$

where C_m is the measured concentration value obtained by analyzing the sample and C_{srm} is the “true” or certified concentration of the analyte in the sample.

For measurements where matrix spikes are used, the %R is calculated as follows:

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

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:

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

where $T_{(n-1,1-"=.99)}$ is the t-distribution value appropriate 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:

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

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:

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

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

Comparability

Comparability is the degree to which one data set can be compared to another. Comparability of data generated at different sites will be ~~assured~~ ensured through the use of standardized, approved testing, sampling, preservation, and analytical techniques and by meeting the QAOs specified in Sections B3-2 through B3-9.

The comparability of waste characterization data shall be ensured through the use of generator/storage site data usability criteria. The Permittees shall ensure that data usability criteria are consistently established and used by the generator/storage sites to assess the usability of analytical and testing data. The criteria shall address. as appropriate, the following:

- Definition or reference of criteria used to define and assign data qualifier flags based on Quality Assurance Objective results,
- Criteria for assessing the useability of data impacted by matrix interferences,
- Criteria for assessing the useability of data based upon positive and negative bias as indicated by quality control data, of data qualifiers, and qualifier flags,
- Criteria for assessing the useability of data due to
  - Severe matrix effects,
  - Misidentification of compounds,
  - Gross exceedance of holding times,
  - Failure to meet calibration or tune criteria
- Criteria for assessing the useability of data that does not meet minimum detection limit requirements.

The Permittees shall be responsible for evaluating generator/storage site data useability and shall assess implementation through the generator/storage site audit.

Representativeness

Representativeness is the degree to which sample data represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that concerns the proper design of the sampling program.

Representativeness of waste containers from waste streams subjected to ~~visual examination and~~ headspace gas, homogeneous solids, and soil/gravel sampling and analysis will be validated, through documentation, that a true random sample with an adequate population was identified and collected consistent with Permit Attachment B2, Section B2-1. Since representativeness is a quality characteristic that expresses the degree to which a sample or group of samples represents the population being studied, the random selection of waste containers ensures representativeness on a Program level. The Permittees shall require the site Project Manager to document that the selected waste containers from within a waste stream were randomly selected. Sampling personnel shall verify that proper procedures are followed to ensure that samples are representative of the waste contained in a particular waste container or a waste stream.

~~Nonconformance to Data Quality Objectives (**DQOs**)~~

~~For any non-administrative nonconformance related to applicable requirements specified in this Waste Analysis Plan (**WAP**) which are first identified at the site Project Manager signature release level (i.e., a failure to meet a data quality objective [**DQO**]), the Permittees shall receive written notification within five (5) calendar days of identification and shall also receive a nonconformance report within thirty (30) calendar days of identification of the incident. The Permittees shall require the generator/storage site to implement a corrective action which remedies the nonconformance prior to management, storage, or disposal of the waste at WIPP. The Permittees shall send NMED a monthly summary of nonconformances identified during the previous month, indicating the number of nonconformances received and the generator/storage sites responsible.~~

Identification of Tentatively Identified Compounds

In accordance with SW-846 convention, identification of compounds detected by gas chromatography/mass spectrometry methods that are not on the list of target analytes shall be reported. Both composited and individual container headspace gas, volatile analysis (TCLP/Totals), and semi-volatile (TCLP/Totals) shall be subject to tentatively identified compound (**TIC**) reporting. These TICs for GC/MS Methods are identified in accordance with the following SW-846 criteria:

- Relative intensities of major ions in the reference spectrum (ions greater than 10% of the most abundant ion) should be present in the sample spectrum.

- The relative intensities of the major ions should agree within ± 20 percent.

- Molecular ions present in the reference spectrum should be present in the sample spectrum.

- Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds.

- Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks.

- The reference spectra used for identifying TICs shall include, at minimum, all of the available spectra for compounds that appear in the 20.4.1.200 NMAC (incorporating 40 CFR Part 261) Appendix VIII list. The reference spectra may be limited to VOCs when analyzing headspace gas samples.

- TICs for headspace gas analyses that are performed through FTIR analyses shall be identified in accordance with the specifications of SW-846 Method 8410.

TICs shall be reported as part of the analytical batch data reports for GC/MS Methods in accordance with the following minimum criteria:

- a TIC in an individual container headspace gas or solids sample shall be reported in the analytical batch data report if the TIC meets the SW-846 identification criteria listed above and is present with a minimum of 10% of the area of the nearest internal standard.

- a TIC in a composited headspace gas sample that contains 2 to 5 individual container samples shall be reported in the analytical batch data report if the TIC meets the SW-846 identification criteria listed above and is present with a minimum of 2% of the area of the nearest internal standard.

- a TIC in a composited headspace gas sample that contains 6 to 10 individual container samples shall be reported in the analytical batch data report if the TIC meets the SW-846 identification criteria listed above and is present with a minimum of 1% of the area of the nearest internal standard.

- a TIC in a composited headspace gas sample that contains 11 to 20 individual container samples shall be reported in the analytical batch data report if the TIC meets the SW-846 identification criteria listed above and is present with a minimum of 0.5% of the area of the nearest internal standard.

TICs that meet the SW-846 identification criteria, are reported in 25 percent of all waste containers sampled from a given waste stream, and that appear in the 20.4.1.200 NMAC (incorporating 40 CFR §261) Appendix VIII list, will be compared to acceptable knowledge data to determine if the TIC is a listed waste in the waste stream. TICs identified through headspace gas analyses that meet the Appendix VIII list criteria and the 25 percent reporting criteria for a waste stream will be added to the headspace gas waste stream target list regardless of the hazardous waste listing associated with the waste stream. TICs reported from the Totals VOC or SVOC analyses may be excluded from the target analyte list for a waste stream if the TIC is a constituent in an F-listed waste whose presence is attributable to waste packaging materials or radiolytic degradation from acceptable knowledge documentation. If a listed waste constituent TIC cannot be attributed to waste packaging materials, radiolysis, or other origins, the constituent will be added to the target analyte list and new hazardous waste ~~codes~~ numbers will be assigned, if appropriate. TICs subject to inclusion on the target analyte list that are toxicity characteristic parameters shall be added to the target analyte list regardless of origin because the hazardous waste designation for these ~~codes~~ numbers is not based on source. However, for toxicity characteristic and non-toxic F003 constituents, the site may take concentration into account when assessing whether to add a hazardous waste ~~code~~ number. If a target analyte list for a waste stream is expanded due to the presence of TICs, all subsequent samples collected from that waste stream will be analyzed for constituents on the expanded list.

B3-2 Headspace-Gas Sampling

Quality Assurance Objectives

~~With the exception of qualifying LANL sealed sources waste containers, headspace-gas sampling will occur from the headspace within each drum of transuranic (**TRU**) mixed waste or randomly selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in Attachment B, Section B-3a(1). The LANL sealed sources waste containers that meet specified conditions must be assigned VOC concentration values in accordance with Section B-3a(1)(iii).~~

The precision and accuracy of the ~~drum~~ container headspace-gas sampling operations must be assessed by analyzing field QC headspace-gas samples. These samples must include equipment blanks, field reference standards, field blanks, and field duplicates. If the QAOs described below are not met, a nonconformance report must be prepared, submitted, and resolved (Section B3-13).

Precision

The precision of the headspace-gas sampling and analysis operation must be assessed by sequential collection of field duplicates for manifold sampling operations or simultaneous collection of field duplicates for direct canister sampling operations for VOCs determination. Corrective actions must be taken if the RPD exceeds 25 percent for any analyte found greater than the PRQL in both of the duplicate samples.

Accuracy

A field reference standard must be collected using headspace-gas sampling equipment to assess the accuracy of the headspace-gas sampling operation at a frequency of one field reference standard for every 20 ~~drums~~ containers sampled or per sampling batch. Corrective action must be taken if the %R of the field-reference standard is less than 70 or greater than 130.

Field blanks must also be collected at a frequency of 1 field blank for every 20 ~~drums~~ containers or sampling batch sampled to assess possible contamination in the headspace gas sampling method. Equipment blanks must also be collected at a frequency of 1 equipment blank for each equipment cleaning batch to assess possible contamination in the equipment cleaning method. Corrective actions must be taken if the blank exceeds three times the MDLs listed for any of the compounds listed in Table B3-2.

Completeness

Sampling completeness shall be expressed as the number of valid samples collected as a percent of the total number of samples collected for each waste stream~~. The completeness can also be expressed as the number of valid samples collected as a percent of the total number of drums for each waste stream.~~ A valid sample is defined as a sample collected in accordance with approved sampling methods and the ~~drum~~ container was properly prepared for sampling (e.g., the polyliner was vented to the ~~drum~~ container headspace). The Permittees shall require participating sampling facilities to achieve a minimum 90 percent completeness. The amount and type of data that may be lost during the headspace-gas sampling operation cannot be predicted in advance. The Permittees shall require the Site Project Quality Assurance (**QA**) Officer to evaluate the importance of any lost or contaminated headspace-gas samples and take corrective action as appropriate.

Comparability

Consistent use and application of uniform procedures and equipment, as specified in Permit Attachment B1 and application of data useability criteria, should ensure that headspace gas sampling operations are comparable when sampling headspace at the different sampling facilities. The Permittees shall require each site to take corrective actions if uniform procedures, equipment, or operations are not followed without approved and justified deviations. In addition, laboratories analyzing samples must successfully participate in the Performance Demonstration Program (**PDP**) (DOE, 2003).

Representativeness

Specific headspace-gas sampling steps to ensure samples are representative include:

- Selection of the correct Drum Age Criteria (**DAC**) Scenario and waste packaging configuration and meeting DAC equilibrium times.
- A sample canister cleaning and leak check after assembly
- Sampling equipment cleaning or disposal after use
- Sampling equipment leak check after sample collection
- Use of sample canisters with passivated internal surfaces
- Use of low-internal-volume sampling equipment
- Collection of samples with a low-sample volume to available headspace volume ratio (less than 10 percent of the headspace when the headspace can be determined)
- Careful and documented pressure regulation of all activities specified in Attachment B1, Section B1-1
- Performance audits
- Collection of equipment blanks, field reference standard, field blanks, and field duplicates at the specified frequencies.
- Manifold pressure sensors and temperature sensors calibrated before initial use and annually using NIST, or equivalent standards.

- OVA calibrated daily, prior to first use, or as necessary according to manufacturers specifications.

Failure to perform the checks at the prescribed frequencies would result in corrective actions.

B3-3 Sampling of Homogeneous Solids and Soils/Gravel

Quality Assurance Objectives

To ensure that sampling is conducted in a representative manner on a waste-stream basis for waste containers containing homogeneous solids and soil/gravel, samples must be collected randomly in both the horizontal and vertical planes of each container's waste. For waste containers that contain homogeneous solids and soil/gravel in smaller containers (e.g., 1 gal [4.0 L] poly bottles) within the waste container, one randomly chosen smaller container must be sampled from each ~~drum~~ container.

Precision

Sampling precision must be determined by collecting and sampling field duplicates (e.g., co-located cores or co-located samples as described in Permit Attachment B1-2b(1)) once per sampling batch or once per week during sampling operations, whichever is more frequent. A sampling batch is a suite of homogeneous solids and soil/gravel samples collected consecutively using the same sampling equipment within a specific time period. A sampling batch can be up to 20 samples (excluding field QC samples), all of which must be collected within 14 days of the first sample in the batch. The Permittees shall require the site Project QA Officer to calculate and report the RPD between co-located core/samples.

The recommended method for establishing acceptance criteria for co-located cores and co-located samples is the F-test method because the F-Test: 1) does not require potentially arbitrary groupings into batches, 2) is based on exact distributions, and 3) is more likely to detect a change in the process. When a sufficient number of samples are collected (25 to 30 pairs of co-located cores or samples), control charts of the RPD will be developed for each constituent and for each waste matrix or waste type (e.g., pyrochemical salts or organic sludges). The limits for the control chart will be three standard deviations above or below the average RPD. Once constructed, RPDs for additional co-located pairs will be compared with the control chart to determine whether or not the co-located cores are acceptable. Periodically, the control charts will be updated using all available data.

The statistical test will involve calculating the variance for co-located cores and samples by pooling the variances computed for each pair of duplicate results. The variance for the waste stream will be computed excluding any data from ~~drums~~ containers with co-located cores, because the test requires the variance estimates to be independent. All data must be transformed to normality prior to computing variances and performing the test. The test hypothesis is evaluated using the F distribution and the method for testing the difference in variances.

Accuracy

Sampling accuracy through the use of standard reference materials shall not be measured. Because waste containers containing homogeneous solids and soil/gravel with known quantities of analytes are not available, sampling accuracy cannot be determined. However, sampling methods and requirements described are designed to minimize sample degradation and hence maximize sampling accuracy.

Sampling accuracy as a function of sampling cross-contamination will be measured. Equipment blanks will be collected at a frequency of once per equipment cleaning batch. Corrective actions must be taken if the blank exceeds three times the MDLs (PRDLs for metals) listed for any of the compounds or analytes listed in Tables B3-4, B3-6, and B3-8. Equipment blanks will be collected from the following equipment types:

- Fully assembled coring tools
- Liners cleaned separately from coring tools
- Miscellaneous sampling equipment that is reused (bowls, spoons, chisels)

Completeness

Sampling completeness shall be expressed as the number of valid samples collected as a percent of the total number of samples collected for each waste stream. A valid sample is any sample that is collected from a randomly selected ~~drum~~ container using randomly selected horizontal and vertical planes in accordance with approved sampling methods. The Permittees shall require participating sampling facilities to achieve a minimum 90 percent completeness.

Comparability

Consistent use and application of uniform procedures, sampling equipment, and measurement units must ensure that sampling operations are comparable. Consistent application of data useability criteria will also ensure comparability. In addition, the Permittees shall require laboratories analyzing samples to successfully participate in the PDP (DOE, 2005).

Representativeness

Specific steps to ensure the representativeness of samples include the following for both waste containers and smaller containers:

- Coring tools and sampling equipment must be clean prior to sampling.

- The entire depth of the waste minus a site defined approved safety factor must be cored, and the core collected must have a length greater than or equal to 50 percent of the depth of the waste. This is called the core recovery and is calculated as follows:

$$Core\ recovery\ (percent) = \frac{y}{x} \times 100 \qquad \text{(B3-10)}$$

where

x = the depth of the waste in the container
y = the length of the core collected from the waste.

- Coring operations and tool selection should be designed to minimize alteration of the in-place waste characteristics. Minimal waste disturbance must be verified by visually examining the core and describing the observation (e.g., undisturbed, cracked, or pulverized) in the field logbook.

  If core recovery is less than 50 percent of the depth of the waste, a second coring location shall be randomly selected. The core with the best core recovery shall be used for sample collection.

One randomly selected container within a ~~drum~~ container will be chosen if the ~~drum~~ container contains individual waste containers.

B3-4 Non Destructive Examination Methods

B3-4a Radiography

Quality Assurance Objectives

The QAOs for radiography are detailed in this section. If the QAOs described below are not met, then corrective action shall be taken. It should be noted that radiography does not have a specific MDL because it is primarily a qualitative determination. The objective of radiography for the program is to verify the waste matrix code and identify prohibited items for each waste container ~~and to estimate each waste material parameter weight (Table B3-1)~~. The Permittees shall require each site to describe all activities required to achieve these objectives in the site quality assurance project plan (**QAPjP**) and standard operating procedures (**SOP**).

Data to meet these objectives must be obtained from ~~an audio/videotaped (or equivalent media)~~ a video and audio recorded scan provided by trained radiography operators at the sites. Results must also be recorded on a radiography data form. The precision, accuracy, completeness, and comparability objectives for radiography data are presented below.

Precision

~~The qualitative determinations, such as verifying the waste matrix code, made during radiography do not lend themselves to statistical evaluation of precision because of the qualitative nature of the inspection. However, comparison of data derived from radiography and visual examination on the same waste containers at the Rocky Flats Environmental Technology Site and the Idaho National Engineering Laboratory indicates that radiography operators can provide estimated inventories and weights of waste items in a waste container. As a measure of precision, the Permittees shall require each Site Project QA Officer to calculate and report the RPD between the estimated waste material parameter weights as determined by radiography and these same parameters as determined by visual examination.~~ Precision is maintained by reconciling any discrepancies between two radiography operators with regard to identification of the waste matrix code, liquids in excess of TSDF-WAC limits, and compressed gases through independent replicate scans and independent observations. Additionally, the precision of radiography is verified prior to use by tuning precisely enough to demonstrate compliance with QAOs through viewing an image test pattern.

Accuracy

~~The programmatic accuracy at which the waste matrix code and waste material parameter weights can be determined must be documented through visual examination of a randomly selected statistical portion of waste containers. The Permittees shall require the Site Project QA Officer to calculate and report the miscertification rate of waste containers that require assignment to a different waste matrix code or are found to contain prohibited items after visual examination as a measure of radiography accuracy. The miscertification rate shall be used to determine the number of drums subject to confirmatory visual examination.~~ Accuracy is obtained by using a target to tune the image for maximum sharpness and by requiring operators to successfully identify 100 percent of the required items in a training container during their initial qualification and subsequent requalification.

Completeness

~~An audio/videotape (or equivalent media)~~ A video and audio media recording of the radiography examination and a validated radiography data form will be obtained for 100 percent of the ~~retrievably stored waste containers in the program for all~~ waste containers subject to radiography. All ~~audio/videotapes (or equivalent media)~~ video and audio media recordings and radiography data forms will be subject to validation as indicated in Section B3-10.

Comparability

The comparability of radiography data from different ~~sites~~ operators shall be enhanced by using standardized radiography procedures and operator qualifications.

B3-4b Visual Examination

Results must be recorded on a VE data form. The precision, accuracy, completeness, and comparability objectives for VE data are presented below.

Precision

Precision is maintained by reconciling any discrepancies between the operator and the independent technical reviewer with regard to identification of waste matrix code, liquids in excess of TSDF-WAC limits, and compressed gases.

Accuracy

Accuracy is maintained by requiring operators to pass a comprehensive examination and demonstrate satisfactory performance in the presence of the VE expert during their initial qualification and subsequent requalification.

Completeness

A validated VE data form will be obtained for 100 percent of the waste containers subject to VE.

Comparability

The comparability of VE data from different operators shall be enhanced by using standardized VE procedures and operator qualifications.

B3-5 Gas Volatile Organic Compound Analysis

Quality Assurance Objectives

The development of data quality objective (**DQOs**) specifically for this program has resulted in the QAOs listed in Table B3-2. The specified QAOs represent the required quality of data necessary to draw valid conclusions regarding program objectives. WAP-required limits, such as the program required quantitation limits (**PRQL**) associated with VOC analysis, are specified to ensure that the analytical data collected satisfy the requirements of all data users. A summary of the Quality Control Samples and the associated acceptance criteria is included in Table B3-3. Key data-quality indicators for laboratory measurements are defined below.

Precision

Precision shall be assessed by analyzing laboratory duplicates and replicate analyses of laboratory-control samples and PDP blind-audit samples. Results from measurements on these samples must be compared to the criteria listed in Table B3-2. These QC measurements will be used to demonstrate acceptable method performance and to trigger corrective action when control limits are exceeded.

Accuracy

Accuracy as %R shall be assessed for the laboratory operations by analyzing PDP blind-audit samples and laboratory-control samples. Results from these measurements must be compared to the criteria listed in Table B3-2. These QC measurements will be used to demonstrate acceptable method performance and to trigger corrective action when control limits are exceeded.

Calibration

GC/MS Tunes, Initial Calibrations, and Continuing Calibration will be performed and evaluated using the procedures and criteria specified in Table B3-3. These criteria will be used to demonstrate acceptable calibration and to trigger corrective action when control limits are exceeded.

Method Detection Limit

MDLs shall be expressed in nanograms for VOCs and must be less than or equal to those listed in Table B3-2. MDLs shall be determined based on the method described in Section B3-1. The detailed procedures for MDL determination shall be included in site SOPs.

Program Required Quantitation Limit

Laboratories must demonstrate the capability to quantitate analytes at or below the PRQLs given in Table B3-2. Laboratories shall set the concentration of at least one calibration standard below the PRQL. The detailed procedures for PRQL demonstration shall be included in laboratory SOPs.

Completeness

Laboratory completeness shall be expressed as the number of samples analyzed with valid results as a percent of the total number of samples submitted for analysis. A composited sample is treated as one sample for the purposes of completeness, because only one sample is run through the analytical instrument. Valid results are defined as results that meet the data useability criteria based on application of the Quality Control Criteria specified in Tables B3-2 and B3-3; and meet the detection limit, calibration representativeness, and comparability criteria within this section. The Permittees shall require that participating laboratories meet the completeness criteria specified in Table B3-2.

Comparability

For VOC analysis, data generated through analysis of samples from different sites shall be comparable. The Permittees shall require each site to achieve comparability by using standardized methods and traceable standards and by requiring all sites to successfully participate in the PDP (DOE, 2003).

Representativeness

Representativeness for VOC analysis shall be achieved by collecting sufficient numbers of samples using clean sampling equipment that does not introduce sample bias. Samples must be collected as described in Permit Attachment B1.

B3-6 Total Volatile Organic Compound Analysis

Quality Assurance Objectives

The development of DQOs specifically for this program has resulted in the QAOs listed in Table B3-4. The specified QAOs represent the required quality of data necessary to draw valid conclusions regarding program objectives. WAP-required limits, such as the PRQL associated with VOC analysis, are specified to ensure that the analytical data collected satisfy the requirements of all data users. Key data-quality indicators for laboratory measurements are defined below.

Precision

Precision shall be assessed by analyzing laboratory duplicates or matrix spike duplicates, replicate analyses of laboratory control samples, and PDP blind-audit samples. Results from measurements on these samples must be compared to the criteria listed in Table B3-4. These QC measurements will be used to demonstrate acceptable method performance and to trigger corrective action when control limits are exceeded.

Accuracy

Accuracy as %R shall be assessed for the laboratory operations by analyzing laboratory control samples, matrix spikes, surrogate compounds, and PDP blind-audit samples. Results from these measurements for matrix spikes samples must be compared to the %R criteria listed in Table B3-4. Results for surrogates and internal standards are evaluated as specified in the SW-846 method (EPA 1996) or Table B3-5. These QC measurements will be used to demonstrate acceptable method performance and to trigger corrective action when control limits are exceeded.

Laboratory blanks shall be assessed to determine possible laboratory contamination and are evaluated as specified in Table B3-5. These QC measurements will be used to demonstrate acceptable levels of laboratory contamination and to trigger corrective action when control limits are exceeded.

Calibration

GC/MS Tunes, Initial Calibrations, and Continuing Calibration will be performed and evaluated using the procedures and criteria specified in Table B3-5 and the SW-846 method (EPA 1996). These criteria will be used to demonstrate acceptable calibration and to trigger corrective action when control limits are exceeded.

Method Detection Limit

MDLs shall be expressed in milligrams per kilogram (mg/kg) for VOCs and must be less than or equal to those listed in Table B3-4. The detailed procedures for MDL determination shall be included in site SOPs.

Program Required Quantitation Limit

Laboratories must demonstrate the capability to quantitate analytes in samples at or below the PRQLs given in Table B3-4. Laboratories shall set the concentration of at least one calibration standard below the PRQL. The detailed procedures for PRQL demonstration shall be included in laboratory SOPs.

Completeness

Laboratory completeness shall be expressed as the number of samples analyzed with valid results as a percent of the total number of samples submitted for analysis. Valid results are defined as results that meet the data useability criteria based upon application of the Quality

Control Criteria specified in Tables B3-4 and B3-5 and meet the calibration, detection limit, representativeness, and comparability criteria within this section. Participating laboratories must meet the completeness criteria specified in Table B3-4.

Comparability

For VOC analysis, data generated through analysis of samples from different sites shall be comparable. The Permittees shall require sites to achieve comparability by using standardized SW-846 sample preparation and methods that meet the QAO requirements in Tables B3-4 and B3-5, traceable standards, and by requiring all sites to successfully participate in the PDP (DOE, 2005). Generator/storage sites may use the most recent version of SW-846. Any changes to SW-846 methodology that results in the elimination of sample preparation or analytical methods in use at generator/storage sites must be addressed as a corrective action to address the comparability of data before and after the SW-846 modification.

Representativeness

Representativeness for VOC analysis shall be achieved by collecting unbiased samples. Samples must be collected as described in Permit Attachment B1.

B3-7 Total Semivolatile Organic Compound Analysis

Quality Assurance Objectives

The development of DQOs specifically for this program has resulted in the QAOs listed in Table B3-6. The specified QAOs represent the required quality of data necessary to draw valid conclusions regarding program objectives. WAP-required limits, such as the PRQLs, are specified to ensure that the analytical data collected satisfy the requirements of all data users. A summary of Quality Control Samples and associated acceptance criteria for this analysis is included in Table B3-7. Key data-quality indicators for laboratory measurements are defined below.

Precision

Precision shall be assessed by analyzing laboratory duplicates or matrix spike duplicates, replicate analyses of laboratory control samples, and PDP blind-audit samples. Results from measurements on these samples must be compared to the criteria listed in Table B3-6. These QC measurements will be used to demonstrate acceptable method performance and to trigger corrective action when control limits are exceeded.

Accuracy

Accuracy as %R shall be assessed for the laboratory operations by analyzing laboratory control samples, matrix spikes, surrogate compounds, and PDP blind-audit samples. Results from these measurements for matrix spikes samples must be compared to the %R criteria listed in Table B3-6. Results for surrogates and internal standards are evaluated as specified in the SW-846 method (EPA 1996) or Table B3-7. These QC measurements will be used to demonstrate acceptable method performance and to trigger corrective action when control limits are exceeded.

Laboratory blanks shall be assessed to determine possible laboratory contamination and are evaluated as specified in Table B3-7. These QC measurements will be used to demonstrate acceptable levels of laboratory contamination and to trigger corrective action when control limits are exceeded.

Calibration

GC/MS Tunes, Initial Calibrations, and Continuing Calibration will be performed and evaluated using the procedures and criteria specified in Table B3-7 and the SW-846 method (EPA 1996). These criteria will be used to demonstrate acceptable calibration and to trigger corrective action when control limits are exceeded.

Method Detection Limit

MDLs shall be expressed in mg/kg for SVOCs and must be less than or equal to those listed in Table B3-6. The detailed procedures for MDL determination shall be included in site SOPs.

Program Required Quantitation Limit

Laboratories must demonstrate the capability to quantitate analytes in samples at or below the PRQLs given in Table B3-6. Laboratories shall set the concentration of at least one calibration standard below the PRQL. The detailed procedures for PRQL demonstration shall be included in laboratory SOPs.

Completeness

Laboratory completeness shall be expressed as the number of samples analyzed with valid results as a percent of the total number of samples submitted for analysis. Valid results are defined as results that meet the data useability criteria based on application of the Quality Control Criteria specified in Tables B3-6 and B3-7 and meet the detection limit, calibration, representativeness, and comparability criteria within this section. The Permittees shall require participating laboratories to meet the level of completeness specified in Table B3-6.

Comparability

For SVOC analysis, data generated through analysis of samples from different sites shall be comparable. The Permittees shall require sites to achieve comparability by using standardized SW-846 sample preparation and methods that meet the QAO requirements in Tables B3-6 and B3-7, traceable standards, and by requiring all sites to successfully participate in the PDP (DOE, 2005). Generator/storage sites may use the most current version of SW-846 if the methods are consistent with QAO requirements. Any changes to SW-846 methodology that results in the elimination of sample preparation or analytical methods in use at generator/storage sites must be addressed as a corrective action to address the comparability of data before and after the SW-846 modification.

Representativeness

Representativeness for SVOC analysis shall be achieved by collecting unbiased samples. Samples must be collected as described in Permit Attachment B1.

B3-8 Total Metal Analysis

Quality Assurance Objectives

The development of DQOs for the program has resulted in the QAOs listed in Table B3-8. The specified QAOs represent the required quality of data necessary to draw valid conclusions regarding program objectives. WAP-required limits, such as the PRQLs associated with metal analysis, are specified to ensure that the analytical data collected satisfy the requirements of all data users. A summary of Quality Control Samples and the associated acceptance criteria for this analysis is provided in Table B3-9. Key data-quality indicators for laboratory measurements are defined below.

Precision

Precision shall be assessed by analyzing laboratory sample duplicates or laboratory matrix spike duplicates, replicate analyses of laboratory-control samples, and PDP blind-audit samples. Results from measurements on these samples must be compared to the criteria listed in Table B3-8. These QC measurements will be used to demonstrate acceptable method performance and to trigger corrective action when control limits are exceeded.

Accuracy

Accuracy shall be assessed through the analysis of laboratory matrix spikes, PDP blind-audit samples, serial dilutions, interference check samples, and laboratory-control samples. Results from these measurements must be compared to the criterion listed in Table B3-8 and B3-9. These QC measurements will be used to demonstrate acceptable method performance and to trigger corrective action when control limits are exceeded.

Laboratory blanks and calibration blanks shall be assessed to determine possible laboratory contamination and are evaluated as specified in Table B3-9. These QC measurements will be used to demonstrate acceptable levels of laboratory contamination and to trigger corrective action when control limits are exceeded.

Calibration

Mass Tunes (for ICP MS only), Standards Calibration, Initial Calibration verifications, and Continuing Calibrations will be performed and evaluated using the procedures and criteria specified in Table B3-9 and the SW-846 method (EPA 1996). These criteria will be used to demonstrate acceptable calibration and to trigger corrective action when control limits are exceeded.

Program Required Detection Limits

PRDLs, expressed in units of micrograms per L (:g/L), are the maximum values for instrument detection limits (**IDL**) permissible for program support under the WAP. IDLs must be less than or equal to the PRDL for the method used to quantitate a specific analyte. Any method listed in Table B-5 of the Waste Analysis Plan (Permit Attachment B) may be used if the IDL meets this criteria. For high concentration samples, an exception to the above requirements may be made in cases where the sample concentration exceeds five times the IDL of the instrument being used. In this case, the analyte concentration may be reported even though the IDL may exceed the PRDL. IDLs shall be determined semiannually (i.e., every six months). Detailed procedures for IDL determination shall be included in laboratory SOPs.

Program Required Quantitation Limit

The Permittees shall require participating laboratories to demonstrate the capability of analyte quantitation at or below the PRQLs in units of mg/kg wet weight (given in Table B3-8). The PRDLs are set an order of magnitude less than the PRQLs (assuming 100 percent solid sample diluted by a factor of 100 during preparation). The Permittees shall require participating laboratories to set the concentration of at least one QC or calibration standard at or below the solution concentration equivalent of the PRQL. Detailed calibration procedures shall be included in site SOPs.

Completeness

Laboratory completeness shall be expressed as the number of samples analyzed with valid results as a percent of the total number of samples submitted for analysis. Valid results are defined as results that meet the data useability criteria based upon application of the Quality Control Criteria specified in Tables B3-8 and B3-9 and meet the detection limit, calibration, representativeness, and comparability criteria within this section. The Permittees shall require participating laboratories to meet the completeness specified in Table B3-8.

Comparability

For metals analysis, data generated through analysis of samples from different sites shall be comparable. Comparability will be achieved by using standardized SW-846 sample preparation and methods that meet QAO requirements in Tables B3-8 and B3-9, demonstrating successful participation in the PDP (DOE, 2005), and use of traceable standards. Generator/storage sites may use the most recent SW-846 update. Any changes to SW-846 methodology that results in the elimination of sample preparation or analytical methods in use at generator/storage sites must be addressed as a corrective action to address the comparability of data before and after the SW-846 modification.

Representativeness

Representativeness for metals analysis shall be achieved by the collection of unbiased samples and the preparation of samples in the laboratory using representative and unbiased methods. Samples must be collected as described in Permit Attachment B1.

B3-9 Acceptable Knowledge

Acceptable knowledge documentation provides primarily qualitative information that cannot be assessed according to specific data quality goals that are used for analytical techniques. QAOs for analytical results are described in terms of precision, accuracy, completeness, comparability, and representativeness. Appropriate analytical and testing results ~~will~~ may be used to ~~confirm~~ augment the characterization of wastes based on acceptable knowledge ~~(Section B4-4 of Attachment B4)~~. To ensure that the acceptable knowledge process is consistently applied, the Permittees shall require sites to comply with the following data quality requirements for acceptable knowledge documentation:

- Precision - Precision is the agreement among a set of replicate measurements without assumption of the knowledge of a true value. The qualitative determinations, such as compiling and assessing acceptable knowledge documentation, do not lend themselves to statistical evaluations of precision. However, the acceptable knowledge information will be addressed by the independent review of acceptable knowledge information during internal and external audits.

- Accuracy - Accuracy is the degree of agreement between an observed sample result and the true value. The percentage of waste containers which require reassignment to a new waste matrix code and/or designation of different hazardous waste ~~codes~~ numbers based ~~an the reevaluation of acceptable knowledge and~~ on sampling and analysis data and ~~waste analysis~~ discrepancies identified by the Permittees during waste confirmation will be reported as a measure of acceptable knowledge accuracy.

- Completeness - Completeness is an assessment of the number of waste streams or number of samples collected to the number of samples determined to be useable through the data validation process. The acceptable knowledge record must contain 100 percent of the required information (Permit Attachment B4-3). The useability of the acceptable knowledge information will be assessed for completeness during audits.

- Comparability - Data are considered comparable when one set of data can be compared to another set of data. Comparability is ensured through sites meeting the training requirements and complying with the minimum standards outlined for procedures that are used to implement the acceptable knowledge process. All sites must assign hazardous waste ~~codes~~ numbers in accordance with Permit Attachment B4-4 and provide this information regarding its waste to other sites who store or generate a similar waste stream.

- Representativeness - Representativeness expresses the degree to which sample data accurately and precisely represent characteristics of a population. Representativeness is a qualitative parameter that will be satisfied by ensuring that the process of obtaining, evaluating, and documenting acceptable knowledge information is performed in accordance with the minimum standards established in Permit Attachment B4. Sites also must assess and document the limitations of the acceptable knowledge information used to assign hazardous waste ~~codes~~ numbers (e.g., purpose and scope of information, date of publication, type and extent to which waste parameters are addressed).

The Permittees shall require each generator/storage site to comply with the nonconformance notification and reporting requirements of Section B3-13 if the results ~~of confirmatory analytical techniques~~ sampling and analysis specified in Permit Attachment B are inconsistent with acceptable knowledge documentation.

The Permittees shall require each site to address quality control by tracking its performance with regard to the use of acceptable knowledge by: 1) assessing the frequency of inconsistencies among information, and 2) documenting the results of acceptable knowledge ~~confirmation~~ verification through radiography, visual examination, headspace-gas analyses, and solidified waste analyses. In addition, the acceptable knowledge process and waste stream documentation must be evaluated through internal assessments by generator/storage site quality assurance organizations and assessments by auditors external to the organization (i.e., the Permittees).

B3-10 Data Review, Validation, and Verification Requirements

Procedures Procedures shall be developed for the review, validation, and verification of data at the data generation level; the validation and verification of data at the project level; and the verification of data at the Permittee level. Data review determines if raw data have been properly collected and ensures raw data are properly reduced. Data validation ~~confirms~~ verifies that the data reported satisfy the requirements of this WAP and is accompanied by signature release. Data verification authenticates that data as presented represent the sampling and analysis activities as performed and have been subject to the appropriate levels of data review. The requirements presented in this section ensure that WAP records furnish documentary evidence of quality.

The Permittees shall require the sites to generate the following Batch Data Reports for data validation, verification, and quality assurance activities:

- A Testing Batch Data Report or equivalent includes all data pertaining to radiography or visual examination for up to 20 waste containers without regard to waste matrix. Table B3-11 lists all of the information required in Testing Batch Data Reports (identified with an “X”) and other information that is necessary for data validation, but is optional in Testing Batch Data Reports (identified with an “O”).

- A Sampling Batch Data Report or equivalent includes all sample collection data pertaining to a group of no more than 20 headspace gas or homogeneous waste samples that were collected for chemical analysis. Table B3-12 lists all of the information required in Sampling Batch Data Reports (identified with an “X”) and other information that is necessary for data validation, but is optional in Sampling Batch Data Reports (identified with an “O”).

- An Analytical Batch Data Report or equivalent includes analytical data from the analysis of TRU-mixed waste for up to 20 headspace gas or homogeneous waste samples.

Analytical Batch Data Reports or equivalent that contain results for composited headspace gas samples must contain sufficient information to identify the containers that were composited for each composite sample and the sample volume that was taken from each waste container. Because Analytical Batch Data Reports are generated based on the number of samples analyzed, an Analytical Batch Data Report may contain results that are applicable to more than 20 containers depending on how many composite samples are part of the report, but may not exceed a total of 20 samples analyzed. Table B3-13 lists all of the information required in Analytical Batch Data Reports (identified with an “X”) and other information that is necessary for data validation, but is optional in Analytical Batch Data Reports (identified with an “O”).

Raw analytical data need not be included in Analytical Batch Data Reports, but must be maintained in the site project files and be readily available for review upon request. Raw data may include all analytical bench sheet and instrumentation readouts for all calibration standard results, sample data, QC samples, sample preparation conditions and logs, sample run logs, and all re-extraction, re-analysis, or dilution information pertaining to the individual samples. Raw data may also include calculation records and any qualitative or semi-quantitative data collected for a sample and that has been recorded on a bench sheet or in a log book.

- An On-line Batch Data Report or equivalent contains the combined information from the Sampling Batch Data Report and Analytical Batch Data Report that is relevant to the on-line method used.

B3-10a Data Generation Level

The following are minimum requirements for raw data collection and management which the Permittees shall require for each site:

- All raw data shall be signed and dated in reproducible ink by the person generating it. Alternately, unalterable electronic signatures may be used.

- All data must be recorded clearly, legibly, and accurately in field and laboratory records (bench sheets, logbooks), and include applicable sample identification numbers (for sampling and analytical labs).

- All changes to original data must be lined out, initialed, and dated by the individual making the change. A justification for changing the original data may also be included. Original data must not be obliterated or otherwise disfigured so as not to be readable. Data changes shall only be made by the individual who originally collected the data or an individual authorized to change the data.

- All data must be transferred and reduced from field and laboratory records completely and accurately.

- All field and laboratory records must be maintained as specified in Table B-~~7~~6 of Attachment B.

- Data must be organized into a standard format for reporting purposes Batch Data Report), as outlined in specific sampling and analytical procedures.

- All electronic and video data must be stored appropriately to ensure that waste container, sample, and associated QC data are readily retrievable. In the case of classified information, additional security provisions may apply that could restrict retrievability. The additional security provisions will be documented in generator/storage site procedures as outlined in the QAPjP in accordance with prevailing classified information security standards.

Data review, validation, and verification at this level involves scrutiny and signature release from qualified independent technical reviewer(s)[1]~~, technical supervisors(s), and a QA representative,~~ as specified below. Individuals conducting this data review, validation, and verification must use checklists that address all of the items included in this section. Checklists must contain or reference tables showing the results of sampling, analytical or on-line batch QC samples, if applicable. Checklists must reflect review of all QC samples and quality assurance objective categories in accordance with criteria established in Tables B3-2 through B3-9 (as applicable to the methods validated). Completed checklists must be forwarded with Batch Data Reports to the project level. Analytical raw data must be available and reviewed by the data generation level reviewer.

B3-10a(1) Independent Technical Review

The independent technical review ensures by review of raw data that data generation and reduction are technically correct; calculations are verified correct; deviations are documented; and QA/QC results are complete, documented correctly, and compared against WAP criteria. This review validates and verifies all of the work documented by the originator.

One hundred percent of the Batch Data Reports must receive an independent technical review. This review shall be performed by an individual other than the data generator who is qualified to have performed the initial work. The independent technical review must be performed as soon as practicably possible in order to determine and correct negative quality trends in the sampling or analytical process. However at a minimum, the independent technical review must be performed before any waste associated with the data reviewed is managed, stored, or disposed at WIPP, unless the data are being obtained from waste sampling and analysis as containers are being retrieved or generated after initial WSPF approval as described in Attachment B2, Section B2-1. The reviewer(s) must release the data as evidenced by signature, and as a consequence ensure the following:

- Data generation and reduction were conducted in a technically correct manner in accordance with the methods used (procedure with revision). Data were reported in the proper units and correct number of significant figures.

- Calculations have been verified by a valid calculation program, a spot check of verified calculation programs, and/or 100 percent check of all hand calculations.

[1]Independent technical review is performed by a competent individual who is not directly responsible for performing the work.

Values that are not verifiable to within rounding or significant difference discrepancies must be rectified prior to completion of independent technical review.

- The data have been reviewed for transcription errors.

- The testing, sampling, or analytical data QA documentation for Batch Data Reports is complete and includes, as applicable, raw data, DAC and equilibrium calculations and times, calculation records, chain-of-custody (**COC**) forms, calibration records (or references to an available calibration package), QC sample results, and copies or originals of gas canister sample tags. Corrective action will be taken to ensure that all Batch Data Reports are complete and include all necessary raw data prior to completion of the independent technical review.

- QC sample results are within established control limits, and if not, the data have been appropriately qualified in accordance with data useability criteria. Data outside of established control limits will be qualified as appropriate, assigned an appropriate qualifier flag, discussed in the case narrative, and included as appropriate in calculations for completeness. QC criteria that were not met are documented.

- Reporting flags (Table B3-14) were assigned correctly.

- Sample holding time and preservation requirements were met, or exceptions documented.

- Radiography tapes have been reviewed (independent observation) on a waste container basis at a minimum of once per testing batch or once per day of operation, whichever is less frequent (Attachment B1, Section B1-3~~b(2)~~). The radiography tape will be reviewed against the data reported on the radiography form to ensure that the data are correct and complete.

- Field sampling records are complete. Incomplete or incorrect field sampling records will be subject to resubmittal prior to completion of the independent technical review.

- QAOs have been met according to the methods outlined in ~~Permit Attachment B3,~~ Sections B3-2 through B3-9.

~~B3-10a(2) Technical Supervisor Review~~

~~The technical supervisor review ensures that the independent technical review was performed completely, that the Batch Data Report is complete, and verifies that the results are technically reasonable. This review validates and verifies that the characterization performed in this area is ready for QA office review.~~

~~One hundred percent of the batch data reports must receive technical supervisory signature release for each testing batch, sampling batch, analytical batch and on-line batch. The technical supervisory signature release must occur as soon as practicably possible after the independent technical review in order to determine and correct negative quality trends in the sampling or analytical process. However at a minimum, the technical supervisory signature release must be performed before any waste associated with the data reviewed is managed, stored, or disposed at WIPP. This release must ensure the following:~~

- ~~The data are technically reasonable based on the technique used.~~
- ~~All data have received independent technical review with the exception of radiography tapes, which shall receive periodic technical review as specified in Attachment B1, Section B1-3b(2).~~
- ~~The testing, sampling, or analytical data QA documentation for Batch Data Reports is complete and includes, as applicable, raw data, DAC and equilibrium calculations and times, calculation records, COC forms, calibration records, QC sample results, and original or copies of gas sample canister tags.~~
- ~~Sample holding time requirements were met, or exceptions documented.~~
- ~~Field sampling records are complete.~~

~~B3-10a(3) QA Officer Review~~

~~The data generation level QA review ensures that the Batch Data Report is complete, that QC checks meet the acceptance criteria, and that the appropriate QAOs have been met. This review verifies and validates that the characterization results meet the program QA/QC, that instrument performance criteria have been met, and that QAOs for the subject characterization area have been met.~~

~~The Permittees shall require for each site that one hundred percent of the Batch Data Reports receive QA officer (or designee) signature release. The QA Officer signature release must occur as soon as practicably possible after the technical supervisory signature release in order to determine and correct negative quality trends in the sampling or analytical process. However at a minimum, the QA Officer signature release must be performed before any waste associated with the data reviewed is managed, stored, or disposed at WIPP. This release must ensure the following:~~

- ~~Independent technical and technical supervisory reviews have been performed as evidenced by the appropriate signature releases.~~
- ~~The QA documentation for Batch Data Reports is complete as appropriate for the point of data generation.~~
- ~~Sampling and analytical QC checks have been properly performed. QC criteria that were not met are documented.~~

- ~~QAOs have been met according to the methods outlined in Section B3-11.~~

B3-10b Project Level

Data validation and verification at this level involves scrutiny and signature release from the Site Project Manager (or designee)~~ and the Site Project QA Officer (or designee)~~. The Permittees shall require each site to meet the following minimum requirements for each waste container. Any nonconformance identified during this process shall be documented on a nonconformance report (Section B3-13).

The Site Project Manager and Site Project QA Officer shall ensure that a repeat of the data generation level review, validation, and verification is performed on the data for a minimum of one randomly chosen waste container quarterly (every three months). This exercise will document that the data generation level review, validation, and verification is being performed according to implementing procedures.

~~B3-10b(1) Site Project QA Officer~~

~~The Site Project QA Officer review ensures that the Batch Data Reports received from the data generation level is complete, validates and verifies that the QC checks were done properly and meet program criteria, and ensures that the QAOs have been met.~~

~~One hundred percent of the Batch Data Reports must receive Site Project QA Officer signature release. The Site Project QA Officer signature release must occur as soon as practicably possible in order to determine and correct negative quality trends in the sampling or analytical process. However at a minimum, the Site Project QA Officer signature release must be performed before any waste associated with the data reviewed is managed, stored, or disposed at WIPP. This signature release must ensure the following:~~

- ~~Batch Data Reports are complete and data are properly reported (i.e., data are reported in correct units, with correct significant figures, and with correct qualifying flags).~~

- ~~Sampling batch QC checks (e.g., equipment blanks, field duplicates, field reference standards) were properly performed, and meet the established QAOs and are within established data useability criteria.~~

- ~~Testing batch QC checks (e.g., replicate scans, measurement system checks) were properly performed. Radiography data are complete and acceptable based on evidence of videotape review of one waste container per day or once per testing batch, whichever is less frequent, as specified in B1-3b(2).~~

- ~~Analytical batch QC checks (e.g., laboratory duplicates, laboratory blanks, matrix spikes, matrix spike duplicates, laboratory control samples) were properly performed and meet the established QAOs and are within established data useability criteria.~~

- ~~On-line batch QC checks (e.g., field blanks, on-line blanks, on-line duplicates, on-line control samples) were properly performed and meet the established QAOs and are within established data useability criteria.~~

- ~~Proper procedures were followed to ensure representative samples of headspace gas and homogeneous solids and soil/gravel were taken.~~

- ~~For LANL sealed sources waste streams, the quality control provisions for VOC source term development were properly implemented in accordance with Permit Attachment B, Section B-3a(1)(iii).~~

B3-10b(~~2~~1) Site Project Manager Review

The Site Project Manager Review is the final validation that all of the data contained in Batch Data Reports from the data generation level are complete and have been properly reviewed as evidenced by signature release and completed checklists.

One hundred percent of the Batch Data Reports must have Site Project Manager signature release. ~~The Site Project Manager signature release must occur as soon as practicably possible after the Site Project QA officer signature release in order to determine and correct negative quality trends in the sampling or analytical process. However at~~ At a minimum, the Site Project Manager signature release must be performed before any waste associated with the data reviewed is managed, stored, or disposed at WIPP, unless the data are being obtained from waste sampling and analysis as containers are being retrieved or generated as described in Permit Attachment B2, Section B2-1. This signature release must ensure the following:

- The ~~Site Project Manager or designee shall determine the~~ validity of the ~~drum age criteria (~~DAC~~)~~ assignment made at the data generation level based upon an assessment of the data collection and evaluation necessary to make the assignment.

- ~~For LANL sealed sources waste streams, the VOC source term was properly developed and used in accordance with Permit Attachment B, Section B-3a(1)(iii).~~

- Testing batch QC checks (e.g., replicate scans, measurement system checks) were properly performed. Radiography data are complete and acceptable based on evidence of videotape review of one waste container per day or once per testing batch, whichever is less frequent, as specified in B1-3.

- Sampling batch QC checks (e.g., equipment blanks, field duplicates, field reference standards) were properly performed, and meet the established QAOs and are within established data useability criteria.

- Analytical batch QC checks (e.g., laboratory duplicates, laboratory blanks, matrix spikes, matrix spike duplicates, laboratory control samples) were properly performed and meet the established QAOs and are within established data useability criteria.

- On-line batch QC checks (e.g., field blanks, on-line blanks, on-line duplicates, on-line control samples) were properly performed and meet the established QAOs and are within established data useability criteria.

- Proper procedures were followed to ~~assure~~ ensure representative samples of headspace gas and homogeneous solids and soil/gravel were taken.

- Data generation level independent technical~~, technical supervisory, and QA officer (or designee)~~ review, validation, and verification have been performed as evidenced by the completed review checklists and appropriate signature releases.

- Batch data review checklists are complete.

- Batch Data Reports are complete and data are properly reported (e.g., data are reported in the correct units, with the correct number of significant figures, and with qualifying flags).

- Verify that data are within established data assessment criteria and meet all applicable QAOs (Sections B3-~~11~~2 through B3-9).

B3-10b(~~3~~2) Prepare Site Project ~~QA Officer~~ Manager Summary and Data Validation Summary

To document the project-level validation and verification described above, the Permittees shall require each Site Project ~~QA Officer~~ Manager (or designee) to prepare a Site Project ~~QA Officer~~ Manager Summary and ~~the Site Project Manager (or designee) to prepare~~ a Data Validation Summary. These reports may be combined to eliminate redundancy~~, and may be included with the Site Project QA Officer and Site Project Manager checklists~~. The Site Project ~~QA Officer~~ Manager Summary includes a validation checklist for each Batch Data Report. Checklists for the Site Project ~~QA Officer~~ Manager Summary must be sufficiently detailed to validate all aspects of a Batch Data Report that affect data quality. The Data Validation Summary provides ~~confirmation~~ verification that, on a per waste container or sample basis as evidenced by Batch Data Report reviews, all data have been validated in accordance with the site QAPjP. The Data Validation Summary must identify each Batch Data Report reviewed (including all waste container numbers), describe how the validation was performed and whether or not problems were detected (e.g., nonconformance reports), and include a statement indicating that all data are acceptable. Summaries must include release signatures.

Once the data have received project-level validation and verification or when the Site Project Manager decides the sample no longer needs to be retained, the Site Project Manager must ensure that the laboratory is notified. Samples must be retained by the laboratory until this notification is received. Gas sample canisters may then be released from storage for cleaning, recertification, and subsequent reuse. Sample tags must be removed and retained in the project files before recycling the canisters. If the Site Project Manager requests that samples or canisters be retained for future use (e.g., an experimental holding time study), the same sample identification and COC forms shall be used and cross-referenced to a document which specifies the purpose for sample or canister retention.

B3-10b(~~4~~3) Prepare Waste Stream Characterization Package

In the event the Permittees request detailed information on a waste stream, the ~~site~~ Site Project Manager will provide a Waste Stream Characterization Package. The Site Project Manager ~~can require each characterization area, data generation level technical supervisor, and QA officer to assist in preparation and review of~~ must ensure that the Waste Stream Characterization Package (Section B3-12b(2)) ~~as necessary to ensure the package~~ will support ~~the Site Project Manager's~~ waste characterization determinations.

B3-10c Permittee Level

The final level of data verification occurs at the Permittee level and must, at a minimum, consist of ~~an inventory check~~ reviewing a sample of the Batch Data Reports during audits of generator/storage sites and Permittee approved laboratories to verify completeness. ~~The~~ During such audits, the Permittees are responsible for the verification that Batch Data Reports include the following:

- Project-level signature releases
- Listing of all waste containers being presented in the report
- Listing of all testing, sampling, and analytical batch numbers associated with each waste container being reported in the package
- Analytical Batch Data Report case narratives
- Site Project ~~QA Officer~~ Manager Summary
- Data Validation Summary
- Complete summarized qualitative and quantitative data for all waste containers with data flags and qualifiers.

For each Waste Stream Profile Form (**WSPF**) submitted for approval, the Permittees must verify that each submittal (i.e., WSPF and Characterization Information Summary) is complete and notify the originating site in writing of the WSPF approval. The Permittees will maintain the data as appropriate for use in the regulatory compliance programs. ~~At a minimum, the verification must:~~

- ~~Ensure the correct assignment of the waste stream description, Waste Matrix Code Group, Summary Category Groups, and EPA hazardous waste codes~~
- ~~Reconcile data~~
- ~~Contain summarized results of characterization~~
- ~~Contain acceptable knowledge summary documentation~~

- ~~List the methods used for characterization~~

For subsequent shipments made after the initial WSPF approval, the verification will also include WWIS internal limit checks (Attachment B, Section B-~~4b(1)(i)~~5a(1)).

B3-11 Reconciliation with Data Quality Objectives

Reconciling the results of waste testing and analysis with the DQOs provides a way to ensure that data will be of adequate quality to support the regulatory compliance programs. Reconciliation with the DQOs will take place at both the project level and the Permittees' level. At the project level, reconciliation will be performed by the Site Project Manager~~;~~, while at the Permittees' level, reconciliation will be performed as described below.

B3-11a Reconciliation at the Project Level

The Permittees shall require each Site Project Manager to ensure that all data generated and used in decision making meet the DQOs provided in Section B-4a(1) of Permit Attachment B. To do so, the Site Project Manager must assess whether data of sufficient type, quality, and quantity have been collected. The Site Project Manager must determine if the variability of the data set is small enough to provide the required confidence in the results. The Site Project Manager must also determine if, based on the desired error rates and confidence levels, a sufficient number of valid data points have been determined (as established by the associated completeness rate for each sampling and analytical process). In addition, the Site Project Manager must document that random sampling of containers was performed for the purposes of waste stream characterization.

For each waste stream characterized, the Permittees shall require each Site Project Manager to determine if sufficient data have been collected to determine the following WAP-required waste parameters, as applicable:

- Waste matrix code
- Waste material parameter weights
- If each waste container of waste contains TRU radioactive waste
- Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, and the number of samples collected for each VOC in the headspace gas of waste containers in the waste stream
- The potential flammability of TRU waste headspace gases
- Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, and number of samples collected for VOCs, SVOCs, and metals in the waste stream
- Whether the waste stream exhibits a toxicity characteristic (**TC**) under 40 CFR Part 261, Subpart C

- Whether the waste stream contains listed waste found in 20.4.1.200 NMAC incorporating 40 CFR Part 261, Subpart D

- Whether the waste stream can be classified as hazardous or nonhazardous at the 90-percent confidence level

- ~~Whether a sufficient number of waste containers have been visually examined (as a QC check on radiography) to determine with a reasonable level of certainty that the~~ ~~UCL_{90}~~ ~~for the miscertification rate is less than 14 percent~~

- Whether an appropriate packaging configuration and ~~Drum Age Criteria (~~DAC~~)~~ were applied and documented in the headspace gas sampling documentation, and whether the drum age was met prior to sampling.

- Whether all TICs were appropriately identified and reported in accordance with the requirements of Section B3-1 prior to submittal of a WSPF for a waste stream or waste stream lot.

- Whether the overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in Sections B3-2 through B3-9 prior to submittal of a WSPF for a waste stream or waste stream lot.

- Whether the PRQLs for all analyses were met prior to submittal of a WSPF for a waste stream or waste stream lot.

If the Site Project Manager determines that insufficient data have been collected to make the determinations listed above, additional data collection efforts must be undertaken. The reconciliation of a waste stream shall be performed, as described in Permit Attachment B4, prior to submittal of WSPF and Characterization Information Summary to the Permittees for that waste stream. ~~For subsequent shipments, data reconciliation is done on all containers or samples prior to shipment to WIPP.~~ The Permittees shall not manage, store, or dispose a TRU mixed waste stream at WIPP unless the Site Project Manager determines that the WAP-required waste parameters listed above have been met for that waste stream.

The statistical procedure presented in Permit Attachment B2 shall be used by participating Site Project Managers to evaluate and report waste characterization data from the analysis of homogeneous solids and soil/gravel. The procedure, which calculates UCL_{90} values, shall be used to assess compliance with the DQOs in Attachment B, Section B-4a(1) as well as with RCRA regulations. The procedure must be applied to all laboratory analytical data for total VOCs, total SVOCs, and total metals. For RCRA regulatory compliance (40 CFR § 261.24), data from the analysis of the appropriate metals and organic compounds shall be expressed as toxicity characteristic leaching procedure (**TCLP**) values or results may also be compared to the TC levels expressed as total values. These total values will be considered the regulatory threshold limit (**RTL**) values for the WAP. RTL values are obtained by calculating the weight/weight concentration (in the solid) of a TC analyte that would give the regulatory weight/volume concentration (in the TCLP extract), assuming 100-percent analyte dissolution.

B3-11b Reconciliation at the Permittee Level

The Permittees must also ensure that data of sufficient type, quality, and quantity are collected to meet WAP DQOs. The Permittees will ensure sufficient data have been collected to determine if the waste characterization information is adequate to demonstrate the Permittees' compliance ~~in accordance~~ with Attachment B, Section B-4a(1). This is performed during Permittees' review of the WSPF and Characterization Information Summary. ~~to determine the following:~~

- ~~The concentration of VOC constituents in the headspace in the total waste inventory has not exceeded the environment performance standards of 20.4.1.500 NMAC (incorporating 40 CFR §264.601(c)) as specified in Module IV;~~
- ~~Whether waste streams proposed for disposal in WIPP have been adequately characterized; and~~
- ~~Whether data supports the information contained in the WIPP RCRA permit application~~

B3-12 Data Reporting Requirements

Data reporting requirements define the type of information and the method of transmittal for data transfer from the data generation level to the project level and from the project level to the Permittees.

B3-12a Data Generation Level

Data shall be transmitted by hard copy or electronically (provided a hard copy is available on demand) from the data generation level to the project level. Transmitted data shall include all Batch Data Reports and data review checklists. The Batch Data Reports and checklists used must contain all of the information required by the testing, sampling, and analytical techniques described in Permit Attachments B1 through B6 , as well as the signature releases to document the review, validation, and verification as described in Section B3-10. All Batch Data Reports and checklists shall be in approved formats, as provided in site-specific documentation.

Batch Data Reports shall be ~~forwarded to the site project office. Site QAPjPs shall specify the individual at the site project office who will receive these reports. After review by the Site Project QA Officer, all Batch Data Reports will be~~ forwarded to the Site Project Manager. All Batch Data Reports shall be assigned serial numbers, and each page shall be numbered. The serial number used for Batch Data Reports can be the same as the testing, sampling, or analytical batch number.

QA documentation, including raw data, shall be maintained in either testing, sampling, and analytical facility files, or site project files for those facilities located on site in accordance with the document storage requirements of site approved site QAPjPs. ~~Contract waste characterization facilities~~ Permittee approved laboratories shall forward testing, sampling, and analytical QA documentation along with Batch Data Reports to the site project office for inclusion in site project files.

B3-12b Project Level

The site project office shall prepare a WSPF for each waste stream certified for shipment to WIPP based on information obtained from acceptable knowledge and Batch Data Reports, if applicable. In addition, the site project office must ensure that the Characterization Information Summary and the Waste Stream Characterization Package (when requested by the Permittees) are prepared as appropriate. The Site Project QA Officer must also verify these reports are consistent with information found in analytical batch reports. Summarized testing, sampling, and analytical data are included in the Characterization Information Summary. The contents of the WSPF, Characterization Information Summary, and Waste Stream Characterization Package are discussed in the following sections.

After approval of a WSPF and the associated Characterization Information Summary by the Permittees, the generator/storage site are required to maintain a cross reference of container identification numbers to each Batch Data Report.

A Waste Stream Characterization Package shall be transmitted by hard copy or electronically from the Site Project Manager to the Permittees when requested.

B3-12b(1) Waste Stream Profile Form

The Waste Stream Profile Form (WSPF, Figure B-1) shall include the following information:

- Generator/storage site name
- Generator/storage site EPA ID
- Date of audit report approval by NMED (if obtained)
- Original generator of waste stream
- Whether waste is Contact-Handled or Remote-Handled
- The Waste Stream WIPP Identification Number
- Summary Category Group
- Waste Matrix Code Group
- Waste Material Parameter Weight Estimates per unit of waste
- Waste stream name
- A description of the waste stream
- Applicable EPA hazardous waste ~~codes~~ numbers
- Applicable TRUCON codes

- A listing of acceptable knowledge documentation used to identify the waste stream

- The waste characterization procedures used and the reference and date of the procedure

- Certification signature of Site Project Manager, name, title, and date signed

B3-12b(2) Characterization Information Summary

The Characterization Information Summary shall include the following elements, if applicable:

- Data reconciliation with DQOs

- Headspace gas summary data listing the identification numbers of samples used in the statistical reduction, the maximum, mean, standard deviation, UCL_{90}, RTL, and associated EPA hazardous waste ~~codes~~ numbers that must be applied to the waste stream.

- ~~For LANL sealed sources waste streams, the VOC source term determination data (as defined by Attachment B, Section B-3a(1)(iii)) listing one-half the method detection limit and mean when used to assign concentrations for the headspace gas target analytes.~~

- Total metal, VOC, and SVOC analytical results for homogeneous solids and soil/gravel (if applicable)~~, and demonstration that control charting cannot be applied effectively, if this option is implemented~~.

- TIC listing and evaluation~~, and verification that acceptable knowledge (**AK**) was confirmed~~.

- Radiography and visual examination summary to document that all prohibited items are absent in the waste ~~and to confirm AK, and documentation and justification for the use of radiography in lieu of or in combination with visual examination/visual examination technique for newly generated waste~~ (if applicable).

- A complete listing of all container identification numbers used to generate the WSPF, cross-referenced to each Batch Data Report

- Complete AK summary, including stream name and number, point of generation, waste stream volume (current and projected), generation dates, TRUCON codes, Summary Category Group, Waste Matrix Code(s) and Waste Matrix Code Group, other TWBIR information, waste stream description, areas of operation, generating processes, RCRA determinations, radionuclide information, all references used to generate the AK summary, and any other information required by Permit Attachment B4, Section B4-2b.

- Method for determining Waste Material Parameter Weights per unit of waste

- Certification through acceptable knowledge or testing and/or analysis that any waste assigned the hazardous waste number of U134 (hydrofluoric acid) no longer exhibits the characteristic of corrosivity. This is ~~confirmed~~ verified by ~~assuring~~ ensuring that no liquid is present in U134 waste.

B3-12b(3) Waste Stream Characterization Package

The Waste Stream Characterization Package includes the following information:

- Waste Stream Profile Form (WSPF, Section B3-12b(1))

- Accompanying Characterization Information Summary (Section B3-12b(2))

- Complete AK summary (Section B3-12b(2))

- Batch Data Reports supporting the ~~confirmation of AK~~ characterization of the waste stream and any others requested by the Permittees

- Raw analytical data requested by the Permittees

B3-12b(4) WIPP Waste Information System (**WWIS**) Data Reporting

The WWIS Data Dictionary includes all of the data fields, the field format and the limits associated with the data as established by this WAP. These data will be subjected to edit and limit checks that are performed automatically by the database, as defined in the *WIPP Waste Information System User's Manual for Use by Shippers/Generators* (DOE, 2001). If a container was part of a composite headspace gas sample, the analytical results from the composite sample must be assigned as the container headspace gas data results, including associated TICs, for every waste container associated with the composite sample.

~~The Permittees will coordinate the data transmission with each generator/storage site. Actual data transmission will use appropriate technology to ensure the integrity of the data transmissions. The Permittees will require sites with large waste inventories and large databases to populate a data structure provided by the Permittees that contains the required data dictionary fields that are appropriate for the waste stream (or waste streams) at that site. For example, totals analysis data will not be requested from sites that do not have homogeneous solids or soil/gravel waste. The Permittees will access this data via the Internet to ensure an efficient transfer of this data. Small quantity sites will be given a similar data structure by the Permittees that is tailored to their types of waste. Sites with very small quantities of waste will be provided with the ability to assemble the data interactively to this data structure on the WWIS.~~

B3-13 Nonconformances

The Permittees shall require the status of work and the WAP activities at participating generator/storage sites to be monitored and controlled by the Site Project Manager ~~and Site Project QA Officer~~. This monitoring and control shall include nonconformance identification, documentation, and reporting.

The nonconformances and corrective action processes specified in this section describe procedures between the Permittees and the generator/storage sites. ~~The Permittees shall comply with the nonconformance requirements specified in Section B3-1 of this Permit Attachment.~~

Nonconformances

Nonconformances are uncontrolled and unapproved deviations from an approved plan or procedure. Nonconforming items and activities are those that do not meet the WAP requirements, procurement document criteria, or approved work procedures. Nonconforming items shall be identified by marking, tagging, or segregating, and the affected generator/storage site(s) notified. The Permittees shall require participating sites reconcile and correct nonconforming items as appropriate in accordance with the Permittees' Quality Assurance Program Description (**QAPD**). Disposition of nonconforming items shall be identified and documented. The QAPjPs shall identify the person(s) responsible for evaluating and dispositioning nonconforming items and shall include referenced procedures for handling them.

Management at all levels shall foster a "no-fault" attitude to encourage the identification of nonconforming items and processes. Nonconformances may be detected and identified by anyone performing WAP activities, including

- Project staff - during field operations, supervision of subcontractors, data validation and verification, and self-assessment
- Laboratory staff - during the preparation for and performance of laboratory testing; calibration of equipment; QC activities; laboratory data review, validation, and verification; and self-assessment
- QA personnel - during oversight activities or audits

A nonconformance report shall be prepared for each nonconformance identified. Each nonconformance report shall be initiated by the individual(s) identifying the nonconformance. The nonconformance report shall then be processed by knowledgeable and appropriate personnel. For this purpose, a nonconformance report including, or referencing as appropriate, results of laboratory analysis, QC tests, audit reports, internal memoranda, or letters shall be prepared. The nonconformance report must provide the following information:

- Identification of the individual(s) identifying or originating the nonconformance
- Description of the nonconformance

- Method(s) or suggestions for correcting the nonconformance (corrective action)
- Schedule for completing the corrective action
- An indication of the potential ramifications and overall useability the data, if applicable
- Any approval signatures specified in the site nonconformance procedures

The Permittees shall require the Site Project ~~QA Officer~~ Manager to oversee the nonconformance report process and be responsible for developing a plan to identify and track all nonconformances and report this information to the Permittees. ~~Documentation of nonconformances shall be made available to the~~ The Site Project Manager~~, who in turn~~ is also responsible for notifying project personnel of the nonconformance~~. Completion~~ and verifying completion of the corrective action for nonconformances ~~must be verified by the Site Project QA Officer~~.

Nonconformance to DQOs

For any non-administrative nonconformance related to applicable requirements specified in this WAP which are first identified at the Site Project Manager signature release level (i.e., a failure to meet a data quality objective DQO), the Permittees shall receive written notification within five (5) calendar days of identification and shall also receive a nonconformance report within thirty (30) calendar days of identification of the incident. The Permittees shall require the generator/storage site to implement a corrective action which remedies the nonconformance prior to management, storage, or disposal of the waste at WIPP. The Permittees shall send NMED a monthly summary of nonconformances identified during the previous month, indicating the number of nonconformances received and the generator/storage sites responsible.

~~The Permittees will receive written notification of all non-administrative nonconformances (i.e., a failure to meet a DQO) first identified during the Site Project Manager Review within five (5) days of identification. The Permittees will also receive a nonconformance report within thirty (30) days of identification. The generator/storage site will implement a corrective action process and resolve the identified nonconformance prior to the Permittees management, storage, or disposal of TRU mixed waste at WIPP.~~

Permittees' Corrective Action Process

The Permittees shall initiate a corrective action process when internal nonconformances and nonconformances at the generator/storage sites are identified. Activities and processes that do not meet requirements are documented as deficiencies.

When a deficiency is identified by the Permittees, the following process action steps are required:

- The condition is documented on a Corrective Action Report (**CAR**) by the individual identifying the problem.

- The Permittees have designated the CAR Initiator and Assessment Team Leader to review the CAR, determine validity of the finding (determine that a requirement has been violated), classify the significance of the condition, assign a response due date, and issue the CAR to the responsible party.

- The responsible organization reviews the CAR, evaluates the extent and cause of the deficiency and provides a response to the Permittees, indicating remedial actions and actions to preclude recurrence that will be taken.

- The Permittees review the response from the responsible organization and, if acceptable, communicate the acceptance to the responsible organization.

- The responsible organization completes remedial actions and actions to preclude recurrence of the condition.

- After all corrective actions have been completed, the Permittees schedule and perform a verification to ~~assure~~ ensure that corrective actions have been completed and are effective. When all actions have been completed and verified as being effective, the CAR is closed by the CAR Initiator and Assessment Team Leader on behalf of the Permittees.

- As part of the planning process for subsequent audits and surveillances, past deficiencies are reviewed and the previous deficient activity or process is subject to reassessment.

B3-14 Special Training Requirements and Certifications

Before performing activities that affect WAP quality, all personnel are required to receive indoctrination into the applicable scope, purpose, and objectives of the WAP and the specific QAOs of the assigned task. Personnel assigned to perform activities for the WAP shall have the education, experience, and training applicable to the functions associated with the work. Evidence of personnel proficiency and demonstration of competence in the task(s) assigned must be demonstrated and documented. All personnel designated to work on specific aspects of the WAP shall maintain qualification (i.e., training and certification) throughout the duration of the work as specified in this WAP and applicable QAPjPs/procedures. Job performance shall be evaluated and documented at periodic intervals, as specified in the implementing procedures.

Personnel involved in WAP activities shall receive continuing training to ensure that job proficiency is maintained. Training includes both education in principles and enhancement of skills. Each participating site shall include in its QAPjP a description of the procedures for implementing personnel qualification and training. All training records that specify the scope of the training, the date of completion, and documentation of job proficiency shall be maintained as QA Records in the site project file.

Analytical laboratory line management must ensure that analytical personnel are qualified to perform the analytical method(s) for which they are responsible. The minimum qualifications for certain specified positions for the WAP are summarized in Table B3-10. QAPjPs, or their implementing SOPs, shall specify the site-specific titles and minimum training and qualification requirements for personnel performing WAP activities. QAPjPs/procedures shall also contain the requirements for maintaining records of the qualification, training, and demonstrations of proficiency by these personnel.

An evaluation of personnel qualifications shall include comparing and evaluating the requirements specified in the job/position description and the skills, training, and experience included in the current resume of the person. This evaluation also must be performed for personnel who change positions because of a transfer or promotion as well as personnel assigned to short-term or temporary work assignments that may affect the quality of the WAP. QAPjPs/procedures shall identify the responsible person(s) for ensuring that all personnel maintain proficiency in the work performed and identify any additional training that may be required.

B3-15 Changes to WAP-Related Plans or Procedures

Controlled changes to WAP-related plans or procedures shall be managed through the document control process described in the QAPD. The Site Project Manager ~~and the Site Project QA Officer~~ shall review all non-administrative changes and evaluate whether those changes could impact DQOs specified in the Permit. After site certification, any changes to WAP-related plans or procedures that could positively or negatively impact DQOs (i.e., those changes that require prior approval of the Permittees as defined in Attachment B5, Section B5-2) shall be reported to the Permittees within five (5) days of identification by the project level review. The Permittees shall send NMED a monthly summary briefly describing the changes to plans and procedures identified pursuant to this section during the previous month.

B3-16 List of References

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TABLES

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TABLE B3-1
WASTE MATERIAL PARAMETERS AND DESCRIPTIONS

Waste Material Parameter	Description
Iron-based Metals/Alloys	Iron and steel alloys in the waste; does not include the waste container materials
Aluminum-based Metals/Alloys	Aluminum or aluminum-based alloys in the waste materials
Other Metals	All other metals found in the waste materials
Other Inorganic Materials	Nonmetallic inorganic waste including concrete, glass, firebrick, ceramics, sand, and inorganic sorbents
Cellulosics	Materials generally derived from high-polymer plant carbohydrates; (e.g., paper, cardboard, wood, and cloth)
Rubber	Natural or man-made elastic latex materials; (e.g., surgeons' gloves, and leaded rubber gloves)
Plastics (waste materials)	Generally man-made materials, often derived from petroleum feedstock; (e.g., polyethylene and polyvinylchloride)
Organic Matrix	Cemented organic resins, solidified organic liquids and sludges
Inorganic Matrix	Any homogeneous materials consisting of sludge or aqueous-based liquids that are solidified with cement, calcium silicate, or other solidification agents; (e.g., wastewater treatment sludge, cemented aqueous liquids, and inorganic particulates)
Soils/gravel	Generally consists of naturally occurring soils that have been contaminated with inorganic waste materials
Steel (packaging materials)	55-gal (208-L) drums
Plastics (packaging materials)	90-mil polyethylene drum liner and plastic bags

TABLE B3-2
GAS VOLATILE ORGANIC COMPOUNDS TARGET ANALYTE LIST AND QUALITY ASSURANCE OBJECTIVES

Compound	CAS Number	Precision[a] (%RSD or RPD)	Accuracy[a] (%R)	MDL[b,~~f~~d] (ng)	FTIRS MDL[b] (ppmv)	PRQL (ppmv)	Completeness (%)
Benzene	71-43-2	#25	70-130	10	5	10	90
Bromoform	75-25-2	#25	70-130	10	5	10	90
Carbon tetrachloride	56-23-5	#25	70-130	10	5	10	90
Chlorobenzene	108-90-7	#25	70-130	10	5	10	90
Chloroform	67-66-3	#25	70-130	10	5	10	90
1,1-Dichloroethane	75-34-3	#25	70-130	10	5	10	90
1,2-Dichloroethane	107-06-2	#25	70-130	10	5	10	90
1,1-Dichloroethylene	75-35-4	#25	70-130	10	5	10	90
cis-1,2-Dichloroethylene	156-59-2	#25	70-130	10	5	10	90
trans-1,2-Dichloroethylene	156-60-5	#25	70-130	10	5	10	90
Ethyl benzene [~~f~~d]	100-41-4	#25	70-130	10	10	10	90
Ethyl ether	60-29-7	#25	70-130	10	5	10	90
~~Formaldehyde[c]~~	~~50-00-0~~	~~#25~~	~~70-130~~	~~10~~	~~10~~	~~10~~	~~90~~
~~Hydrazine[d]~~	~~302-01-2~~	~~#25~~	~~70-130~~	~~10~~	~~10~~	~~10~~	~~90~~
Methylene chloride	75-09-2	#25	70-130	10	5	10	90
1,1,2,2-Tetrachloroethane	79-34-5	#25	70-130	10	5	10	90
Tetrachloroethylene	127-18-4	#25	70-130	10	5	10	90
Toluene	108-88-3	#25	70-130	10	5	10	90
1,1,1-Trichloroethane	71-55-6	#25	70-130	10	5	10	90
Trichloroethylene	79-01-6	#25	70-130	10	5	10	90
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	#25	70-130	10	5	10	90
m-Xylene[~~e~~c]	108-38-3	#25	70-130	10	5	10	90
o-Xylene	95-47-6	#25	70-130	10	5	10	90
p-Xylene[~~e~~c]	106-42-3	#25	70-130	10	5	10	90
Acetone	67-64-1	#25	70-130	150	50	100	90
Butanol	71-36-3	#25	70-130	150	50	100	90
Methanol	67-56-1	#25	70-130	150	50	100	90
Methyl ethyl ketone	78-93-3	#25	70-130	150	50	100	90
Methyl isobutyl ketone	108-10-1	#25	70-130	150	50	100	90

[a] Criteria apply to PRQL concentrations.
[b] Values based on delivering 10 mL to the analytical system.
~~[c] Required only for homogeneous solids and soil/gravel waste from Savannah River Site.~~
~~[d] Required only for homogeneous solids and soil/gravel waste from Oak Ridge National Laboratory and Savannah River Site.~~
[~~e~~c] These xylene isomers cannot be resolved by GC/MS.
[~~f~~d] The ethyl benzene PRQL for FTIRS is 20 ppm

CAS	=	Chemical Abstract Service
%RSD	=	Percent relative standard deviation
RPD	=	Relative percent difference
%R	=	Percent recovery
MDL	=	Method detection limit (maximum permissible value), for GC/MS and GC/FID; total number of nanograms delivered to the analytical system per sample (nanograms); for FTIRS based on 1 m sample cell
PRQL	=	Program required quantitation limit (parts per million/volume basis)

TABLE B3-3
SUMMARY OF LABORATORY QUALITY CONTROL SAMPLES AND FREQUENCIES FOR GAS VOLATILE ORGANIC COMPOUND ANALYSIS

QC Sample	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Method performance samples	Seven (7) samples initially and four (4) semiannually	Meet method QAOs	Repeat until acceptable
Laboratory duplicates or on-line duplicates	One (1) per analytical batch or on-line batch	RPD # 25[b]	Nonconformance if RPD >25
Laboratory blanks or on-line blanks	Daily prior to sample analysis for GC/MS and GC/FID. Otherwise, daily prior to sample analysis and one (1) per analytical batch or on-line	Analyte amounts # 3 x MDLs for GC/MS and GC/FID; # PRQL for FTIRS	Flag Data if analyte amounts > 3 x MDLs for GC/MS and GC/FID; > PRQL for FTIRS
Laboratory control samples or on-line control samples	One (1) per analytical batch or on-line batch	70-130 %R	Nonconformance if %R <70 or >130
GC/MS comparison sample (for FTIRS only)	One (1) per analytical or on-line batch	RPD # 25[b]	Nonconformance if RPD > 25
Blind audit samples	Samples and frequency controlled by the Gas PDP Plan	Specified in the Gas PDP Plan	Specified in the Gas PDP Plan

[a] Corrective action per Section B3-13 when final reported QC samples do not meet the acceptance criteria.
[b] Applies only to concentrations greater than the PRQLs listed in Table B3-2.

MDL	=	Method Detection Limit
QAO	=	Quality Assurance Objective
PDP	=	Performance Demonstration Program
PRQL	=	Program Required Quantitation Limit
%R	=	Percent Recovery
RPD	=	Relative Percent Difference

TABLE B3-4
VOLATILE ORGANIC COMPOUNDS TARGET ANALYTE LIST AND QUALITY ASSURANCE OBJECTIVES

Compound	CAS Number	Precision[a] (%RSD or RPD)	Accuracy[a] (%R)	MDL[b] (mg/kg)	PRQL[b] (mg/kg)	Completeness (%)
Benzene	71-43-2	#45	37-151	1	10	90
Bromoform	75-25-2	#47	45-169	1	10	90
Carbon disulfide	75-15-0	#50	60-150	1	10	90
Carbon tetrachloride	56-23-5	#30	70-140	1	10	90
Chlorobenzene	108-90-7	#38	37-160	1	10	90
Chloroform	67-66-3	#44	51-138	1	10	90
1,4-Dichlorobenzene[c]	106-46-7	#60	18-190	1	10	90
ortho-Dichlorobenzene[c]	95-50-1	#60	18-190	1	10	90
1,2-Dichloroethane	107-06-2	#42	49-155	1	10	90
1,1-Dichloroethylene	75-35-4	#250	D-234[d]	1	10	90
trans-1,2-Dichloroethylene	156-60-5	#50	60-150	1	10	90
Ethyl benzene	100-41-4	#43	37-162	1	10	90
Methylene chloride	75-09-2	#50	D-221[d]	1	10	90
1,1,2,2-Tetrachloroethane	79-34-5	#55	46-157	1	10	90
Tetrachloroethylene	127-18-4	#29	64-148	1	10	90
Toluene	108-88-3	#29	47-150	1	10	90
1,1,1-Trichloroethane	71-55-6	#33	52-162	1	10	90
1,1,2-Trichloroethane	79-00-5	#38	52-150	1	10	90
Trichloroethylene	79-01-6	#36	71-157	1	10	90
Trichlorofluoromethane	75-69-4	#110	17-181	1	10	90
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	#50	60-150	1	10	90
Vinyl chloride	75-01-4	#200	D-251[d]	1	4	90
m-xylene	108-38-3	#50	60-150	1	10	90
o-xylene	95-47-6	#50	60-150	1	10	90
p-xylene	106-42-3	#50	60-150	1	10	90
Acetone	67-64-1	#50	60-150	10[e]	100	90
Butanol	71-36-3	#50	60-150	10[e]	100	90
Ethyl ether	60-29-7	#50	60-150	10[e]	100	90
Formaldehyde[f]	50-00-0	#50	60-150	10[e]	100	90
Hydrazine[g]	302-01-2	#50	60-150	10[e]	100	90
Isobutanol	78-83-1	#50	60-150	10[e]	100	90
Methanol	67-56-1	#50	60-150	10[e]	100	90
Methyl ethyl ketone	78-93-3	#50	60-150	10[e]	100	90
Pyridine[c]	110-86-1	#50	60-150	10[e]	100	90

[a] Applies to laboratory control samples and laboratory matrix spikes. If a solid laboratory control sample material which has established statistical control limits is used, then the established control limits for that material should be used for accuracy requirements.
[b] TCLP MDL and PRQL values are reported in units of mg/l and limits are reduced by a factor of 20.
[c] Can also be analyzed as a semi-volatile organic compound. If analyzed as a semi-volatile compound, the QAOs of Table B3-6 apply.
[d] Detected; result must be greater than zero.
[e] Estimate, to be determined.
[f] Required only for homogeneous solids and soil/gravel waste from Savannah River Site, if analysis is required to resolve assignment of EPA hazardous waste numbers.
[g] Required only for homogeneous solids and soil/gravel waste from Oak Ridge National Laboratory and Savannah River Site, if analysis is required to resolve assignment of EPA hazardous waste numbers.

CAS	=	Chemical Abstract Service
%RSD	=	Percent relative standard deviation
RPD	=	Relative percent difference
%R	=	Percent recovery
MDL	=	Method detection limit (maximum permissible value) (milligrams per kilogram)
PRQL	=	Program required quantitation limit; calculated from the toxicity characteristic level for benzene assuming a 0.9 oz (25-gram [g]) sample, 0.1 gal (0.5 liter [L]) of extraction fluid, and 100 percent analyte extraction (milligrams per kilogram)

TABLE B3-5
SUMMARY OF LABORATORY QUALITY CONTROL SAMPLES AND FREQUENCIES FOR VOLATILE ORGANIC COMPOUND ANALYSIS

QC Sample	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Method performance samples	Seven (7) samples initially and four (4) semiannually	Meet Table B3-4 QAOs	Repeat until acceptable
Laboratory duplicates[b]	One (1) per analytical batch	Meet Table B3-4 precision QAOs	Nonconformance if RPDs > values in Table B3-4
Laboratory blanks	One (1) per analytical batch	Analyte concentrations # 3 x MDLs	Nonconformance if analyte concentrations > 3 x MDLs
Matrix spikes[b]	One (1) per analytical batch	Meet Table B3-4 accuracy QAOs	Nonconformance if %Rs are outside the range specified in Table B3-4
Matrix spike duplicates	One (1) per analytical batch	Meet Table B3-4 accuracy and precision QAOs	Nonconformance if RPDs > values and %Rs outside range specified in Table B3-4
Laboratory control samples	One (1) per analytical batch	Meet Table B3-4 accuracy QAO's	Nonconformance if %R < 80 or > 120
GC/MS Calibration	BFB Tune every 12 hours 5-pt. Initial Calibration initially, and as needed	Abundance criteria met as per method Calibrate according to SW-846 Method requirements: %RSD for CCC # 30, %RSD for all other compounds # 15% Average response factor (RRF) used if %RSD # 15, use linear regression if %RSD >15; R or R^2 $ 0.990 if using alternative curve System Performance Check Compound (SPCC) minimum RRF as per SW-846 Method; RRF for all other compounds $ 0.01	Repeat until acceptable

QC Sample	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
GC/MS Calibration (continued)	Continuing Calibration every 12 hours	%D # 20 for CCC; SPCC minimum RRF as per SW-846 Method; RRF for all other compounds $ 0.01 RT for internal standard must be ± 30 seconds from last daily calibration, internal standard area count must be >50% and <200% of last daily calibration	Repeat until acceptable
GC/FID Calibration	3-pt. Initial Calibration initially and as needed Continuing Calibration every 12 hours	Correlation Coefficient $ 0.990 or %RSD # 20 for all analytes %D or %Drift for all analytes # 15 of expected values, RT ± 3 standard deviations from initial RT calibration per applicable SW-846 Method	Repeat until acceptable.
Surrogate compounds	Each analytical sample	Average %R from minimum of 30 samples for a given matrix ±3 standard deviations	Nonconformance if %R < (average %R - 3 standard deviation) or > (average %R + 3 standard deviation)
Blind audit samples	Samples and frequency controlled by the Solid PDP Plan	Specified in the Solid PDP Plan	Specified in the Solid PDP Plan

[a] Corrective Action per Section B3-13 when final reported QC samples do not meet the acceptance criteria. Nonconformances do not apply to matrix related exceedances.
[b] May be satisfied using matrix spike duplicate; acceptance criteria applies only to concentrations greater than the PRQLs listed in Table B3-4.

MDL = Method detection limit
QAO = Quality assurance objective
PDP = Performance Demonstration Program
%R = Percent recovery
RPD = Relative percent difference

TABLE B3-6
SEMI-VOLATILE ORGANIC COMPOUND TARGET ANALYTE LIST AND QUALITY ASSURANCE OBJECTIVES

Compound	CAS Number	Precision[a] (%RSD or RPD)	Accuracy [a] (%R)	MDL[b] (mg/kg)	PRQL[b] (mg/kg)	Completeness (%)
Cresols	1319-77-3	#50	25-115	5	40	90
1,4-Dichlorobenzene[bc]	106-46-7	#86	20-124	5	40	90
ortho-Dichlorobenzene[c]	95-50-1	#64	32-129	5	40	90
2,4-Dinitrophenol	51-28-5	#119	D-172[d]	5	40	90
2,4-Dinitrotoluene	121-14-2	#46	39-139	0.3	2.6	90
Hexachlorobenzene	118-74-1	#319	D-152[d]	0.3	2.6	90
Hexachloroethane	67-72-1	#44	40-113	5	40	90
Nitrobenzene	98-95-3	#72	35-180	5	40	90
Pentachlorophenol	87-86-5	#128	14-176	5	40	90
Pyridine[c]	110-86-1	#50	25-115	5	40	90

CAS = Chemical Abstract Service
%RSD = Percent relative standard deviation
RPD = Relative percent difference
%R = Percent recovery
MDL = Method detection limit (maximum permissible value) (milligrams per kilogram)
PRQL = Program required quantitation limit; calculated from the toxicity characteristic level for nitrobenzene assuming a 100-gram (g) sample, 0.5 gal (2 liter [L]) of extraction fluid, and 100 percent analyte extraction (milligrams per kilograms)

[a] Applies to laboratory control samples and laboratory matrix spikes. If a solid laboratory control sample material which has established statistical control limits is used, then the established control limits for that material should be used for accuracy requirements.
[b] TCLP MDL and PRQL values are reported in units of mg/l and limits are reduced by a factor of 20.
[c] Can also be analyzed as a volatile organic compound
[d] Detected; result must be greater than zero

TABLE B3-7
SUMMARY OF LABORATORY QUALITY CONTROL SAMPLES AND FREQUENCIES FOR SEMI-VOLATILE ORGANIC COMPOUNDS ANALYSIS

QC Sample	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Method performance samples	Seven (7) samples initially and four (4) semiannually	Meet Table B3-6 QAOs	Repeat until acceptable
Laboratory duplicates[b]	One (1) per analytical batch	Meet Table B3-6 precision QAOs	Nonconformance if RPDs > values in Table B3-6
Laboratory blanks	One (1) per analytical batch	Analyte concentrations # 3 x MDLs	Nonconformance if analyte concentrations > 3 x MDLs
Matrix spikes	One (1) per analytical batch	Meet Table B3-6 accuracy QAOs	Nonconformance if RPDs > values and %Rs outside range in Table B3-6
GC/MS Calibration	DFTPP Tune every 12 hours 5-pt. Initial Calibration initially, and as needed Continuing Calibration every 12 hours	Abundance criteria met as per method Calibrate according to SW-846 Method requirements: %RSD for CCC # 30, %RSD for all other compounds # 15% Average response factor (RRF) used if %RSD # 15, use linear regression if >15; R or R^2 $0.990 if using alternative curve System Performance Check Compound (SPCC) minimum RRF as per SW-846 Method; RRF for all other compounds $ 0.01 %D# 20 for CCC, SPCC minimum RRF as per SW-846 Method; RRF for all other compounds $ 0.01 RT for internal standard must be ± 30 seconds from last daily calibration, internal standard area count must be >50% and <200% of last daily calibration	Repeat until acceptable

QC Sample	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
GC/ECD Calibration	5-pt. Calibration initially and as needed Continuing Calibration every 12 hours	Correlation Coefficient $ 0.990 or %RSD < 20 for all analytes %D or %Drift for all analytes # 15 of expected values, RT ± 3 standard deviations of initial RT calibration per applicable SW-846 Method	Repeat until acceptable
Matrix spike duplicates	One (1) per analytical batch	Meet Table B3-6 accuracy and precision QAOs	Nonconformance if RPDs > values and %Rs outside range specified in Table B3-6
Laboratory control samples	One (1) per analytical batch	Meet Table B3-6 accuracy QAO's	Nonconformance if %R < 80 or > 120
Surrogate compounds	Each analytical sample	Average %R from minimum of 30 samples from a given matrix ±3 standard deviations	Nonconformance if %R < (average %R - 3 standard deviations) or > (average %R + 3 standard deviations)
Blind audit samples	Samples and frequency controlled by the Solid PDP Plan	Specified in the Solid PDP Plan	Specified in the Solid PDP Plan

[a] Corrective action per Section B3-13 when final reported QC samples do not meet the acceptance criteria. Nonconformances do not apply to matrix related exceedances.
[b] May be satisfied by using matrix spike duplicate; acceptance criteria applies only to concentrations greater than the PRQLs listed in Table B3-6.

MDL = Method Detection Limit
QAO = Quality Assurance Objective
PDP = Performance Demonstration Program
%R = Percent Recovery
RPD = Relative Percent Difference

TABLE B3-8
METALS TARGET ANALYTE LIST AND QUALITY ASSURANCE OBJECTIVES

Analyte	CAS Number	Precision (%RSD or RPD)[a]	Accuracy (%R)[b]	PRDL[d] (µg/L)	PRQL[c] (mg/kg)	Completeness (%)
Antimony	7440-36-0	#30	80-120	100	100	90
Arsenic	7440-38-2	#30	80-120	100	100	90
Barium	7440-39-3	#30	80-120	2000	2000	90
Beryllium	7440-41-7	#30	80-120	100	100	90
Cadmium	7440-43-9	#30	80-120	20	20	90
Chromium	7440-47-3	#30	80-120	100	100	90
Lead	7439-92-1	#30	80-120	100	100	90
Mercury	7439-97-6	#30	80-120	4.0	4.0	90
Nickel	7440-02-0	#30	80-120	100	100	90
Selenium	7782-49-2	#30	80-120	20	20	90
Silver	7440-22-4	#30	80-120	100	100	90
Thallium	7440-28-0	#30	80-120	100	100	90
Vanadium	7440-62-2	#30	80-120	100	100	90
Zinc	7440-66-6	#30	80-120	100	100	90

[a] # 30 percent control limits apply when sample and duplicate concentrations are $ 10 x IDL for ICP-AES and AA techniques, and $ 100 x IDL for Inductively Coupled Plasma—Mass Spectrometry (ICP-MS) techniques. If less than these limits, the absolute difference between the two values shall be less than or equal to the PRQL.
[b] Applies to laboratory control samples and laboratory matrix spikes. If a solid laboratory control sample material which has established statistical control limits is used, then the established control limits for that material should be used for accuracy requirements.
[c] TCLP PRQL values are reported in units of mg/l and limits are reduced by a factor of 20.
[d] PRDL set such that it is a factor of 10 below the PRQL for 100 percent solid samples, assuming a 100x dilution during digestion.

CAS = Chemical Abstract Service
%RSD = Percent relative standard deviation
RPD = Relative percent difference
%R = Percent recovery
PRDL = Program required detection limit (i.e., maximum permissible value for IDL) (micrograms per liter)
PRQL = Program required quantitation limit (milligrams per kilogram)

TABLE B3-9
SUMMARY OF LABORATORY QUALITY CONTROL SAMPLES AND FREQUENCIES FOR METALS ANALYSIS

QC Sample	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Method performance samples	Seven (7) samples initially and four (4) semiannually	Meet Table B3-8 QAOs	Repeat until acceptable
Laboratory blanks	One (1) per analytical batch	# 3 x IDL (# 5 x IDL for ICP-MS)[b]	Redigest and reanalyze any samples with analyte concentrations which are #10 x blank value and $ 0.5 x PRQL
Matrix spikes	One (1) per analytical batch	Meet Table B3-8 accuracy QAOs	Nonconformance if %R outside the range specified in Table B3-8
Matrix spike duplicates	One (1) per analytical batch	Meet Table B3-8 accuracy and precision QAOs	Nonconformance if RPDs > values and %Rs outside range specified in Table B3-8
ICP-MS Tune (ICP-MS Only)	Daily	4 Replicate %RSD # 5; mass calibration within 0.9 amu; resolution < 1.0 amu full width at 10% peak height	Nonconformance if %RSD > 5; mass calibration > 0.9 amu; resolution > 1.0 amu
Initial Calibration 1 blank, 1 standard (ICP, ICP-MS) 3 standard, 1 blank (GFAA, FLAA) 5 standard, 1 blank (CVAA, HAA)	Daily	90-110 %R (80-120% for CVAA, GFAA, HAA, FLAA) for initial calibration verification solution. Regression coefficient $ 0.995 for FLAA, CVA, GFAA, MAA	Correct problem and recalibrate; repeat initial calibration
Continuing Calibration	Every 10 samples and beginning and end of run	90-110% for continuing calibration verification solution. (80-120% for CVAA, GFAA, HAA, FLAA)	Correct problem and recalibrate; rerun last 10 samples
Internal Standard Area Verification (ICP-MS)	Every Sample	Meet SW-846 Method 6020 criteria	Nonconformance if not reanalyzed at 5 X dilution until criteria are met

QC Sample	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Serial Dilution (ICP, ICP-MS)	One (1) per analytical batch	5 X dilution must be #10% D of initial value for sample > 50xIDL	Flag Data if >10% and > 50xIDL
Interference Correction Verification (ICP, ICP-MS)	Beginning and end of run or every 12 hours (8 for ICP) whichever is more frequent	80-120% recovery for analytes Note: Acceptance Criteria and Corrective Action apply only if interferents found in samples at levels greater than ICS A Solution	Correct problem and recalibrate, nonconformance if not corrected
Laboratory Control Samples	One (1) per analytical batch	Table B3-8 accuracy QAOs	Redigest and reanalyze for affected analytes; non conformance if not reanalyzed
Blind audit samples	Samples and frequency controlled by the Solid PDP Plan	Specified in the Solid PDP Plan	Specified in the Solid PDP Plan

[a] Corrective action per Section B3-13 when final reported QC samples do not meet the acceptance criteria. Nonconformances do not apply to matrix related exceedances.
[b] Applies only to concentrations greater than the PRQLs listed in Table B3-8.

IDL = Instrument Detection Limit
PDP = Performance Demonstration Program
PRQL = Program Required Quantitation Limit
%R = Percent Recovery
RPD = Relative Percent Difference

TABLE B3-10
MINIMUM TRAINING AND QUALIFICATIONS REQUIREMENTS [a]

Personnel	Requirements[a]
Radiography Operators[c]	Site-specific training based on waste matrix codes and waste material parameters; requalification every 2 years
FTIRS Technical Supervisors[b] FTIRS Operators[c]	Site-specific and on-the-job training based on the site-specific FTIRS system; requalification every 2 years
Gas Chromatography Technical Supervisors[b] Gas Chromatography Operators[c]	B.S. or equivalent experience and 6 months previous applicable experience
Gas Chromatography/Mass Spectrometry Operators[c] Mass Spectrometry Operators[c]	B.S. or equivalent experience and 1 year independent spectral interpretation or demonstrated expertise
Gas Chromatography/Mass Spectrometry Technical Supervisors[b] Mass Spectrometry Technical Supervisors[b] Atomic Absorption Spectroscopy Technical Supervisors[b] Atomic Absorption Spectroscopy Operators[c] Atomic Mass Spectrometry Operators[c] Atomic Emission Spectroscopy Operators[c]	B.S. or equivalent experience and 1 year applicable experience
Atomic Mass Spectrometry Technical Supervisors[b]	B.S. and specialized training in Atomic Mass Spectrometry and 2 years applicable experience
Atomic Emission Spectroscopy Technical Supervisors[b]	B.S. and specialized training in Atomic Emission Spectroscopy and 2 years applicable experience.

[a] Based on requirements contained in *USEPA Contract Laboratory Program Statement of Work for Organics Analysis* (Document Number OLM 01.0) and *Statement of Work for Inorganics Analysis* (Document Number ILM 03.0).
[b] Technical Supervisors are those persons responsible for the overall technical operation and development of a specific laboratory technique. QAPjPs shall include the site-specific title for this position.
[c] Operators are those persons responsible for the actual operation of analytical equipment. QAPjPs shall include the site-specific title for this position.

TABLE B3-11
TESTING BATCH DATA REPORT CONTENTS

Required Information	Radiography	Visual Examination ~~as QC Check on Radiography~~	~~Visual Verification of Acceptable Knowledge~~	Comment
Batch Data Report Date	X	X	~~X~~	
Batch number	X	X	~~X~~	
Waste container number	X	X	~~X~~	
Waste stream name and/or number	O	O	~~O~~	
Waste Matrix Code	X	X	~~X~~	Summary Category Group included in waste matrix code
Implementing procedure (specific version used)	X	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	~~O~~	Drums, Standard Waste Box, Ten Drum Overpack, etc.
Video~~tape~~ media reference	X	X		Reference to Video~~tape(s)~~ media applicable to each container. For visual examination ~~(for characterization)~~ of newly generated waste, video~~tape~~ 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 check of scales~~		~~O~~	~~O~~	~~Available documented evidence calibrated scale(s) were used. Only applicable if items are weighed during the visual examination.~~
QC documentation	X	X	~~X~~	
~~Description of liners and layers of confinement (if possible)~~	~~X~~	~~X~~	~~X~~	
~~Indication of vented rigid liners~~	~~X~~	~~X~~	~~X~~	~~Only required for containers with rigid liners. If radiography is used to verify, then include in Testing Batch Data Report.~~
~~Description of container contents~~	~~X~~	~~X~~	~~X~~	~~Provide enough detail to identify all discernible waste items, etc., and to verify estimated weights for the 12 waste material parameters.~~

Required Information	Radiography	Visual Examination ~~as QC Check on Radiography~~	~~Visual Verification of Acceptable Knowledge~~	Comment
Verification that the physical form matches the waste stream description and Waste Matrix Code.	X	X	~~X~~	Summary Category Group included in waste matrix code
~~Indication of sealed containers > 4L~~	~~X~~	~~X~~	~~X~~	
~~Amount of free liquids~~	~~X~~	~~X~~	~~X~~	
~~Estimated weights for the 12 waste material parameters~~	~~X~~	~~X~~	~~X~~	~~Table B3-1 lists waste material parameters.~~
~~Container gross weight~~	~~X~~	~~X~~	~~X~~	
~~Container empty weight~~	~~O~~	~~O~~	~~O~~	~~Established, documented empty container weights can be used.~~
Comments	X	X	~~X~~	
Reference to or copy of associated NCRs, if any	X	X	~~X~~	Copies of associated NCRs must be available.
Visual examination expert decisions		X		Only applicable if visual examination expert is consulted during visual examination.
Verify absence of prohibited items	X	X	~~X~~	
Operator signature and date of test	X	X	~~X~~	Signatures of both operators required for Visual Verification of Acceptable Knowledge
Signature of visual examination expert and date		X		
Data review checklists	X	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.

TABLE B3-12
SAMPLING BATCH DATA REPORT CONTENTS

Required Information	Headspace Gas~~[a]~~	Solid Sampling	Comment
Batch Data Report Date	X	X	
Batch number	X	X	
Waste stream name and/or number	O	O	
Waste Matrix Code		X	Summary Category Group included in Waste Matrix Code
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 number	X	X	
Container type	O	O	Drums, Standard Waste Box, Ten Drum Overpack, etc.
Sample matrix and type	X	X	
Analyses requested and laboratory	X	X	
Point of origin for sampling	X	X	Location where sample was taken (e.g., building number, room)
Sample number	X	X	
Sample size	X	X	
Sample location	X	X	Location within container where sample is taken. (For HSG, specify what layer of confinement was sampled. For solids, physical location within container.)
Sample preservation	X	X	
Person collecting sample	X	X	
Person attaching custody seal	O	O	May or may not be the same as the person collecting the sample
Chain of custody record	X	X	Original or copy is allowed
Sampling equipment numbers	X	X	For disposable equipment, a reference to the lot

Required Information	Headspace Gas[a]	Solid Sampling	Comment
Drum age	X		Must include all supporting determinative information, including but not limited to packaging date, equilibrium start time, storage temperature, and sampling date/time. If Scenario 3 is used, the packaging configuration, filter diffusivity, liner presence/absence, and rigid liner vent hole diameter used in determining the DAC must be documented. If Scenario 1 and 2 are used together, the filter diffusivity and rigid liner vent hole diameter used in determining the DAC must be documented. If default values are used for retrievably stored waste, these values must clearly be identified as such.
Cross-reference of sampling equipment numbers with associated cleaning batch numbers	O	X	As applicable to the equipment used for the sampling. For disposable equipment, a reference to the lot and procurement records to support cleanliness is sufficient
Drum age	X		
Equilibration time	X		
Verification of rigid liner venting	X		Only applicable to containers with rigid liners
Verification that sample volume taken is small in comparison to the available volume	X		Must include headspace gas volume when it can be estimated
Scale Calibration		O	
Depth of waste		X	For newly generated waste, if a sampling method other than coring is used, this is replaced by documentation that a representative sample has been taken.
Calculation of core recovery		X	For newly generated waste, if a sampling method other than coring is used, this is replaced by documentation that a representative sample has been taken.
Co-located core description		X	For newly generated waste, if a sampling method other than coring is used, this is replaced by documentation that a QC sample has been taken.
Time between coring and subsampling		X	Only applicable to coring.
OVA calibration and reading	O		Only applicable to manifold systems. Must be done in accordance with manufacturer's specifications
Field Records	X	X	Must contain the following as applicable to the sampling method used: Collection problems, Sequence of sampling collection, Inspection of the solids sampling area, Inspection of the solids sampling equipment, Coring tool test, random location of sub-sample, canister pressure, and ambient temperature and pressure.
Reference to or copy of associated NCRs, if any	X	X	Copies of associated NCRs must be available.

Required Information	Headspace Gas~~[a]~~	Solid Sampling	Comment
Operator Signature and date and time of sampling	X	X	
Data review checklists	X	X	All data review checklists will be identified

~~[a] The headspace gas sampling batch data report is not required for the LANL sealed sources waste containers that meet specified conditions and are assigned VOC concentration values in accordance with Section B-3a(1)(iii).~~

LEGEND:

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

TABLE B3-13
ANALYTICAL BATCH DATA REPORT CONTENTS

Required Information	Headspace Gas~~[a]~~	Solid Sampling	Comment
Batch Data Report Date	X	X	
Batch number	X	X	
Sample numbers	X	X	
QC designation for sample	X	X	
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.
QC sample results	X	X	
Sample data forms	X	X	Form should contain reduced data for target analytes and TICs
Chain of custody	X	X	Original or copy
Gas canister tags	X		Original or copy
Sample preservation	X	X	
Holding time		X	
Cross-reference of field numbers to laboratory sample numbers	X	X	
Date and time analyzed	X	X	
~~Confirmation~~ Verification of spectra used for results	O	O	Analyst must qualitatively evaluate the validity of the results based on the spectra, can be implemented as a check box for each sample
TIC evaluation	X	X	
Reporting flags, if any	X	X	Table B3-14 lists applicable flags
Case narrative	X	X	
Reference to or copy of associated NCRs, if any	X	X	Copies of associated NCRs must be available.
Operator signature and analysis date	X	X	
Data review checklists	X	X	All data review checklists will be identified

~~[a] The headspace gas analytical batch data report is not required for the LANL sealed sources waste containers that meet specified conditions and are assigned VOC concentration values in accordance with Section B-3a(1)(iii).~~

LEGEND:

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

TABLE B3-14
DATA REPORTING FLAGS

DATA FLAG	INDICATOR
B	Analyte detected in blank (Organics/ Headspace gases)
B	Analyte blank concentration greater than or equal to 20 percent of sample concentration prior to dilution corrections (Metals)
E	Analyte exceeds calibration curve (Organics/ Headspace gases)
J	Analyte less than PRQL but greater than or equal to MDL (Organics/ Headspace gases)
J	Analyte greater than or equal to IDL but less than 5 times the IDL before dilution correction (Metals)
U	Analyte was not detected and value is reported as the MDL (IDL for Metals)
D	Analyte was quantitated from a secondary dilution, or reduced sample aliquot (Organics/ Headspace gases)
Z	One or more QC samples do not meet acceptance criteria
H	Holding time exceeded

FIGURES

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Figure B3-1
Overall Headspace-Gas Sampling Scheme Illustrating Manifold Sampling

ATTACHMENT B4

TRU MIXED WASTE CHARACTERIZATION USING ACCEPTABLE KNOWLEDGE

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ATTACHMENT B4

TRU MIXED WASTE CHARACTERIZATION USING ACCEPTABLE KNOWLEDGE

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ATTACHMENT B4
TRU MIXED WASTE CHARACTERIZATION USING ACCEPTABLE KNOWLEDGE

B4-1 Introduction

The Resource Conservation and Recovery Act (**RCRA**) regulations codified in 40 CFR Parts 260 through 265, 268, and 270, and the New Mexico Hazardous Waste Management Regulations in Title 20 New Mexico Administrative Code, Chapter 4, Part 1, (20.4.1 NMAC) Subparts I through VI, Subpart VIII, and Subpart IX, authorize the use of acceptable knowledge (**AK**) in appropriate circumstances by waste generators, or treatment, storage, or disposal facilities to characterize hazardous waste. Acceptable knowledge is described in *Waste Analysis: EPA Guidance Manual for Facilities That Generate, Treat, Store and Dispose of Hazardous Waste* (EPA, 1994). Acceptable knowledge, as an alternative to sampling and analysis, can be used to meet all or part of the waste characterization requirements under the RCRA (EPA, 1994).

EPA's 1994 Waste Analysis Guidance Manual broadly defines the term "acceptable knowledge" to include~~s a number of techniques used to characterize transuranic (**TRU**) mixed waste, such as~~ process knowledge, whereby detailed information on the wastes is obtained from existing published or documented waste analysis data or studies conducted on hazardous waste generated by processes similar to that which generated the waste; facility records of analysis ~~acquired prior to~~ performed before the effective date of RCRA;~~, and other supplemental sampling~~ and waste analysis data obtained from generators of similar wastes that send their wastes off-site for treatment, storage, or disposal (EPA, 1994).~~ Radiography~~ If a generator/storage site determines that AK alone is insufficient to accurately characterize a waste, the site may use radiography and/or visual examination, headspace gas sampling and analysis, and homogeneous waste sampling and analysis (specified in Permit Attachment B1) ~~are used~~ to complete the waste characterization process and satisfy~~ acquire supplemental sampling and analysis data to meet~~ the requirements of the Waste Analysis Plan (**WAP**) specified in Permit Attachment B. Acceptable knowledge is used in TRU mixed waste characterization activities in~~ three~~ five ways:

- To delineate TRU mixed waste streams
- To assess whether TRU mixed wastes comply with the Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (**TSDF-WAC**)
- To assess~~ if~~ whether TRU mixed~~ heterogeneous debris~~ wastes exhibit a~~ toxicity~~ hazardous characteristic (20.4.1.200 NMAC, incorporating 40 CFR §261~~.24~~ Subpart C)
- To assess~~ if~~ whether TRU mixed wastes are listed (20.4.1.200 NMAC, incorporating 40 CFR §261~~.31~~ Subpart D)
- To estimate waste material parameter weights

Sampling and analysis ~~shall~~ may be performed after waste packaging to ~~confirm~~ augment the characterization of wastes based on acceptable knowledge when an AK Sufficiency Determination has not been requested by the generator/storage site or, if requested, has not been granted by the Permittees (see Section B4-3d). ~~and to update and modify initial AK assessments~~. Sampling and analysis ~~includes~~ consists of radiography, visual examination, headspace gas, and homogeneous waste sampling and analysis. TRU mixed waste streams shall undergo applicable provisions of the acceptable knowledge process prior to management, storage, or disposal by the Permittees at WIPP.

B4-2 Acceptable Knowledge Documentation

The Permittees shall obtain from each Department of Energy (**DOE**) TRU mixed waste generator/storage site (**site**) a logical sequence of acceptable knowledge information that progresses from general facility information (TRU Mixed Waste Management Program Information) to more detailed waste-specific information (TRU Mixed Waste Stream Information). Traceability of acceptable knowledge information for a selected container ~~drum~~ in the audited Waste Summary Category Group(s) will be examined during the Permittees' audit of a site (Section B4-3f). The consistent presentation of acceptable knowledge documentation among sites in auditable records[1] will allow ~~Waste Isolation Pilot Plant (**WIPP**) personnel~~ the Permittees to verify the completeness and adequacy of acceptable knowledge for TRU mixed waste characterization during the audit process. The Permittees shall implement the acceptable knowledge process as specified in this Permit to characterize TRU mixed wastes and obtain sufficient waste characterization data to demonstrate compliance with the Permit. The New Mexico Environment Department (**NMED**) may independently validate the implementation of and compliance with applicable provisions of the WAP at each generator/storage site by participation in the Permittees' Audit and Surveillance Program (Permit Attachment B6). The Permittees shall provide NMED with current audit schedules and notify NMED in writing no later than thirty (30) calendar days prior to each audit. NMED may choose to accompany the Permittees on any audit of the WAP implementation.

The following sections include the information the Permittees will require for each site to characterize TRU mixed waste using acceptable knowledge. Because waste generating processes are site-specific, sites shall, as necessary, ~~supplement~~ augment the required acceptable knowledge records with additional supporting information (see Section B4-2c, ~~Supplemental~~ Supporting Acceptable Knowledge Information). If the required information is not available for a particular waste stream, ~~supplemental information shall be obtained and~~ the waste stream will not be eligible for an AK Sufficiency Determination as specified in Section B4-3d ~~accepted for management, storage, or disposal at the WIPP facility as a retrievably stored waste (i.e., the waste will be characterized as specified in Permit Attachment B, Section B-3d(1))~~.

[1] "Auditable records" mean those records which allow the Permittees to conduct a systematic assessment, analysis, and evaluation of the Permittees compliance with the WAP and this Permit.

B4-2a Required TRU Mixed Waste Management Program Information

TRU mixed waste management program information shall clearly define waste categorization schemes and terminology, provide a breakdown of the types and quantities of TRU mixed waste that are generated and stored at the site, and describe how waste is tracked and managed at the site, including historical and current operations. Information related to TRU mixed waste certification procedures and the types of documentation (e.g., waste profile forms) used to summarize acceptable knowledge shall also be provided. The following information shall be included as part of the acceptable knowledge written record:

- Map of the site with the areas and facilities involved in TRU mixed waste generation, treatment, and storage identified
- Facility mission description as related to TRU mixed waste generation and management (e.g., nuclear weapons research may involve metallurgy, radiochemistry, and nuclear physics operations that result in specific waste streams)
- Description of the operations that generate TRU mixed waste at the site (e.g., plutonium recovery, weapons design, or weapons fabrication)
- Waste identification or categorization schemes used at the facility (e.g., item description codes, content codes)
- Types and quantities of TRU mixed waste generated, including historical generation through future projections
- Correlation of waste streams generated from the same building and process, as appropriate (e.g., sludge, combustibles, metals, and glass)
- Waste certification procedures for retrievably stored and newly generated wastes to be sent to the WIPP facility

B4-2b Required TRU Mixed Waste Stream Information

The Permittees may use acceptable knowledge to delineate site-specific waste streams. For each TRU mixed waste stream, the Permittees shall require sites to compile all process information and data that support the acceptable knowledge used to characterize that waste stream. The type and quantity of supporting documentation will vary by waste stream, depending on the process generating the waste and site-specific requirements imposed by the Permittees. At a minimum, the waste process information shall include the following written information:

- Area(s) and/or building(s) from which the waste stream was or is generated
- Waste stream volume and time period of generation (e.g., 100 standard waste boxes of retrievable stored waste generated from June 1977 through December 1977)

- Waste generating process described for each building (e.g., batch waste stream generated during decommissioning operations of glove boxes), including processes associated with U134 waste generation, if applicable.

- Process flow diagrams (e.g., a diagram illustrating glove boxes from a specific building to a size reduction facility to a container storage area). In the case of research/development, analytical laboratory waste, or other similar processes where process flow diagrams cannot be created, a description of the waste generating processes, rather than a formal process flow diagram, may be included if this modification is justified and the justification is placed in the auditable record

- Material inputs or other information that identifies the chemical content of the waste stream and the physical waste form (e.g., glove box materials and chemicals handled during glove box operations; data obtained through visual examination of newly generated waste that later undergoes radiography; information demonstrating neutralization of U134 [hydrofluoric acid] and waste compatibility, etc.)

The acceptable knowledge written record shall include a summary that identifies all sources of waste characterization information used to delineate the waste stream. The basis and rationale for delineating each waste stream, based on the parameters of interest, shall be clearly summarized and traceable to referenced documents. Assumptions made in delineating each waste stream also shall be identified and justified. If discrepancies exist between required information, then sites shall apply all hazardous waste ~~codes~~ numbers indicated by the information to the subject waste stream unless the sites choose to justify an alternative assignment and document the justification in the auditable record. The Permittees shall obtain from each site, at a minimum, procedures that comply with the following acceptable knowledge requirements:

- Procedures for identifying and assigning the physical waste form of the waste

- Procedures for delineating waste streams and assigning Waste Matrix Codes

- Procedures for resolving inconsistencies in acceptable knowledge documentation

- ~~Procedures~~ If an AK Sufficiency Determination is not being sought, procedures for ~~confirming~~ augmenting acceptable knowledge information through headspace gas sampling and analysis, visual examination and/or radiography, and homogeneous waste sampling and analysis

- ~~Procedures~~ For newly generated waste, procedures describing ~~management~~ process controls used to ensure prohibited items (specified in the WAP, Permit Attachment B) are documented and managed

- ~~Procedures~~ If an AK Sufficiency Determination is not being sought, procedures to ensure radiography and visual examination include a list of prohibited items that the operator shall verify are not present in each container of waste (e.g., liquids exceeding TSDF-WAC limits, corrosives, ignitables, reactives, and incompatible wastes)

- Procedures to document how changes to Waste Matrix Codes, waste stream assignment, and associated Environmental Protection Agency (**EPA**) hazardous waste numbers based on material composition are documented for any waste

- ~~Procedures for newly generated waste shall describe how acceptable knowledge is confirmed using either the visual examination technique or radiography (or VE in lieu of radiography). Procedures shall also describe the criteria for selecting either radiography or VE to ensure there is documentation and adequate justification of the process selected~~

- Procedures for assigning EPA hazardous waste numbers to TRU mixed waste streams
- Procedures for estimating waste material parameter weights

B4-2c ~~Supplemental~~ Supporting Acceptable Knowledge Information

The generator/storage sites shall obtain ~~supplemental~~ supporting acceptable knowledge information. The amount and type of ~~supplemental~~ supporting information is site-specific and cannot be mandated, but sites shall collect information as appropriate to ~~support~~ augment required information. Adequacy of ~~supplemental~~ supporting information shall be assessed by the Permittees during audits (Section B4-3~~f~~g). Sites will use this information to compile the acceptable knowledge written record. ~~Supplemental~~ Supporting acceptable knowledge documentation that may be used (if available) in addition to the required information specified above include, but are not limited to, the following information:

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

- Standard operating procedures that may include a list of raw materials or reagents, a description of the process or experiment generating the waste, and a description of wastes generated and how the wastes are managed at the point of generation

- Preliminary and final safety analysis reports and technical safety requirements

- Waste packaging logs

- Test plans or research project reports that describe reagents and other raw materials used in experiments

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

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

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

- Analytical data relevant to the waste stream, including results from fingerprint analyses, spot checks, or routine verification sampling. This may also include new information ~~acquired apart from the confirmatory process~~ which ~~supplements~~ augments required information (e.g., visual examination not performed in compliance with the WAP)

- Material Safety Data Sheets, product labels, or other product package information

- Sampling and analysis data from comparable or surrogate waste streams (e.g., equivalent nonradioactive materials)

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

For waste containers that belong to LANL sealed sources waste streams, these containers do not require headspace gas sampling and analysis ~~and meet the criteria of Permit Attachment B, Section B-3a(1)(iii),~~ if the following information is ~~required as~~ part of the AK documentation:

- Documentation that the waste container contents meet the definition of sealed sources per 10 CFR §30.4 and 10 CFR §835.2 (effective January 1, 2004).

- Documentation of the certification of the sealed sources as U.S. Department of Transportation Special Form Class 7 (Radioactive) Material per 49 CFR §173.403 (effective October 1, 2003).

- Documentation of contamination survey results that validate the integrity of each sealed source per 10 CFR §34.27 (effective January 1, 2004).

- AK documentation does not indicate the use of VOCs or VOC-bearing materials as constituents of the sealed sources.

- The outer casing of each sealed source must be of a non-VOC bearing material, which must be verified ~~using the VE technique~~ at the time of packaging.

- AK Documentation shall also include but shall not be limited to, as available and as necessary to determine the hazardous constituents associated with sealed sources, the following: source manufacturer's sales catalogues, original purchase records, source manufacturer's fabrication documents, source manufacturer's drawings, source manufacturer's fuel capture assembly reports, source manufacturer's operational procedures for cleanliness requirements, source manufacturer's shipping documents, source manufacturer's welding records, transuranic batch material records, and information from national databases (e.g., NMMSS). All of this information may not and need not be available for each source, but sufficient information must be included in the auditable record to derive an adequate understanding of source construction and history to ensure that no VOCs are present in association with the sealed source itself that would render the source hazardous. If AK data indicate that assignment of a hazardous waste number related to organic materials is required in association with a source, this specific source will be assigned to a separate waste stream and that waste stream will be subject to representative headspace gas sampling unless a separate AK Sufficiency Determination is approved by the Permittees for the waste stream.

All specific, relevant ~~supplemental~~ supporting acceptable knowledge documentation assembled and used in the acceptable knowledge process, whether it supports or contradicts any required acceptable knowledge documentation, shall be identified and an explanation provided for its use (e.g., identification of a toxicity characteristic). ~~Supplemental~~ Supporting documentation may be used to further document the rationale for the hazardous characterization results. The collection and use of ~~supplemental~~ supporting information shall be assessed by the Permittees during site audits to ensure that hazardous waste characterization is supported, as necessary, by ~~supplemental~~ supporting information. Similar to required information, if discrepancies exist between ~~supplemental~~ supporting information and the required information, then sites shall apply all hazardous waste ~~codes~~ numbers indicated by the ~~supplemental~~ supporting information to the subject waste stream unless the sites choose to justify an alternative assignment and document the justification in the auditable record.

B4-3 Acceptable Knowledge Training, Procedures and Other Requirements

The Permittees shall require consistency among sites in using acceptable knowledge information to characterize TRU mixed waste by the use of the following ~~three phase process~~: 1) compiling the required and ~~supplemental~~ supporting acceptable knowledge documentation in an auditable record, 2) ~~confirming and updating acceptable knowledge information using radiography and/or visual examination, headspace-gas sampling and analysis, and homogeneous waste sampling and analysis, and 3)~~ auditing acceptable knowledge records, and 3) WSPF approval and waste confirmation. This section specifies qualification and training requirements, describes each phase of the process, specifies the procedures that the Permittees shall require all sites to develop to implement the requirements for using acceptable knowledge, and specifies data quality requirements for acceptable knowledge.

B4-3a Qualifications and Training Requirements

Site personnel responsible for compiling acceptable knowledge, assessing acceptable knowledge, and resolving discrepancies associated with acceptable knowledge shall be qualified and trained in the following areas at a minimum:

- WIPP WAP in Permit Attachment B and the ~~Treatment, Storage and Disposal Facility Waste Acceptance Criteria (~~TSDF-WAC~~)~~ specified in this permit
- State and Federal RCRA regulations associated with solid and hazardous waste characterization
- Discrepancy resolution and reporting processes
- Site-specific procedures associated with waste characterization using acceptable knowledge

B4-3b Acceptable Knowledge Assembly~~,~~ and Compilation~~, and Confirmation Procedures and Required Administrative Controls~~

The Permittees shall obtain from sites acceptable knowledge procedures which require consistent application of the acceptable knowledge process and requirements. Site-specific acceptable knowledge procedures shall address the following:

- Sites shall prepare and implement a written procedure outlining the specific methodology used to assemble acceptable knowledge records, including the origin of the documentation, how it will be used, and any limitations associated with the information (e.g., identify the purpose and scope of a study that included limited sampling and analysis data).

- Sites shall develop and implement a written procedure to compile the required acceptable knowledge record.

- Sites shall develop and implement a written procedure that ensures unacceptable wastes (e.g., reactive, ignitable, corrosive) are identified and segregated from TRU mixed waste populations sent to WIPP.

- Sites shall prepare and implement a written procedure to evaluate acceptable knowledge and resolve discrepancies. If different sources of information indicate different hazardous wastes are present, then sites shall include all sources of information in its records and conservatively assign all potential hazardous waste ~~codes~~ numbers unless the sites choose to justify an alternative assignment and document the justification in the auditable record. The assignment of hazardous waste ~~codes~~ numbers shall be tracked in the auditable record to all required documentation.

- Sites shall prepare and implement a written procedure to identify hazardous wastes and assign the appropriate hazardous waste ~~codes~~ numbers to each waste stream. The following are minimum baseline requirements/standards that site-specific procedures shall include to ensure comparable and consistent characterization of hazardous waste:

  - Compile all of the required information in an auditable record.

  - Review the compiled information and delineate TRU mixed waste streams. Delineation of waste streams must comply with the following definition: a waste stream is defined as waste material generated from a single process or from an activity that is similar in material, physical form, and hazardous constituents.

  - Review the compiled information to determine if the waste stream is compliant with the TSDF-WAC.

  - Review the required information to determine if the waste is listed under 20.4.1.200 NMAC (incorporating 40 CFR §261), Subpart D. Assign all listed hazardous waste ~~codes~~ numbers unless the sites choose to justify an alternative assignment and document the justification in the auditable record.

- Review the required information to determine if the waste exhibits a hazardous characteristic or may contain hazardous constituents included in the toxicity characteristics specified in 20.4.1.200 NMAC (incorporating 40 CFR §261), Subpart C. If a toxicity characteristic contaminant is identified and is not included as a listed waste, assign the toxicity characteristic ~~code~~ number unless data are available that demonstrate that the concentration of the constituent in the waste is less than the toxicity characteristic regulatory level. When data are not available, the toxicity characteristic hazardous waste ~~code~~ number for the identified hazardous constituent shall be applied to the mixed waste stream.

- Review the compiled information to provide an estimate of material parameter weights for each container to be stored or disposed of at WIPP.

For newly generated wastes, procedures shall be developed and implemented to characterize hazardous waste using acceptable knowledge prior to packaging the waste.

- ~~Sites shall develop and implement a written procedure for the confirmation of acceptable knowledge in accordance with Section B4-3(d).~~

- ~~Sites shall prepare and implement a written procedure that provides a cross reference to the applicable waste summary category group (i.e., S3000, S4000, and S5000) to verify all of the required confirmation data has been evaluated and the proper hazardous waste codes have been assigned.~~

- Sites shall ensure that results of ~~other~~ audits of the TRU mixed waste characterization programs at the site are available in the records.

- Sites shall identify all process controls (implemented to ensure that the waste contains no prohibited items and to control hazardous waste content and/or physical form) that may have been applied to retrievably stored waste and/or may presently be applied to newly generated waste. Process controls are applied at the time of waste generation/packaging to control waste content, whereas any activities performed after waste generation/packaging to identify prohibited items, hazardous waste content, or physical form are waste characterization activities, not process controls. The AK record must contain specific process controls and supporting documentation identifying when these process controls are used to control waste content. See Permit Attachment B, Section B-2 for programmatic requirements related to process controls.

~~Furthermore, the Permittees shall require the sites to implement procedure(s) which specify the administrative controls used by the site to ensure that prohibited items are documented and~~

~~managed in accordance with site-specific certification plans. The following minimum elements shall be addressed in site-specific documentation associated with administrative controls:~~

- ~~Identify the organization(s) responsible for compliance with administrative controls.~~
- ~~Identify the oversight procedures and frequency of actions to verify compliance with administrative controls.~~
- ~~Develop on-the-job training specific to administrative control procedures.~~
- ~~Ensure that personnel may stop work if noncompliance with administrative controls is identified.~~
- ~~Develop a nonconformance process that complies with the requirements in Section B3 of the WAP to document and establish corrective actions.~~
- ~~As part of the corrective action process, assess the potential time frame of the noncompliance, the potentially affected waste population(s), and the reassessment and recertification of those wastes.~~

B4-3c Criteria for Assembling an Acceptable Knowledge Record and Delineating the Waste Stream

Figure B4-1 provides an overview of the process for assembling acceptable knowledge documentation into an auditable record. The first step is to assemble all of the required acceptable knowledge information and any ~~supplemental~~ supporting information regarding the materials and processes that generate a specific waste stream. The Permittees shall require the sites to implement procedures which comply with the following criteria to establish acceptable knowledge records:

- Acceptable knowledge information shall be compiled in an auditable record, including a road map for all applicable information.
- The overview of the facility and TRU mixed waste management operations in the context of the facility's mission shall be correlated to specific waste stream information.
- Correlations between waste streams, with regard to time of generation, waste generating processes, and site-specific facilities shall be clearly described. For newly generated wastes, the rate and quantity of waste to be generated shall be defined.
- A reference list shall be provided that identifies documents, databases, Quality Assurance protocols, and other sources of information that support the acceptable knowledge information.

Container inventories for TRU mixed waste currently in retrievable storage shall be delineated into waste streams by correlating the container identification to all of the required acceptable knowledge information and any ~~supplemental~~ supporting acceptable knowledge information.

B4-3d AK Sufficiency Determination Request Contents

Generator/storage sites may elect to submit an AK Sufficiency Determination Request (**Determination Request**) for those waste streams that can be adequately characterized through acceptable knowledge alone, without the need to perform post packaging chemical or physical sampling and analysis on any containers in the waste stream. The Determination Request shall include, at a minimum:

- A complete AK Summary that addresses the following technical requirements:
  - Executive Summary;
  - Waste Stream Identification Summary, including a demonstration that the waste stream has been properly delineated and meets the Permit definition of waste stream (Permit Attachment B, Introduction),;
  - Mandatory Program Information (including, but not limited to, facility location and description, mission, defense waste assessment, spent nuclear fuel and high-level waste assessment, description of waste generating processes, research/development [as necessary], facility support operations [as applicable], types and quantities of TRU waste generated, correlation of waste streams to buildings/processes, waste identification and categorization, physical form identifiers);
  - Mandatory Waste Stream Information (including, but not limited to, Area and Building of Generation, waste stream volume/period of generation (including, for newly generated waste, the rate and quantity of waste to be generated), waste generating activities, types of waste generated, material input related to physical form and identification of percentage of each waste material parameter in the waste stream, chemical content information including hazardous constituents and hazardous waste identification, prohibited item content (including documented evidence that the waste meets the TSDF-WAC Permit Conditions II.C.3.a-h), waste packaging, presence of filter vents, number of layers of confinement);
  - Types of supporting information gathered;
  - Container specific data (if available and relevant); and
  - A complete reference list including all mandatory and supporting information
- An AK roadmap (defined as a cross reference between mandatory programmatic and mandatory waste stream information, with references supporting these requirements)
- A complete reference list including all mandatory and supporting documentation.
- Relevant supporting information for the required programmatic and waste stream data addressed in the AK Summary, examples of which are presented in Permit Attachment B4, Section B4-2c.
- Identification of any mandatory requirements supported only by upper tier documents (i.e., there is insufficient supporting data).

- Description or other means of demonstrating that the AK process described in the Permit was followed (for example, AK personnel were appropriately trained; discrepancies were documented, etc).
- Information showing that the generator/storage site has developed a written procedure for compiling the AK information and assigning hazardous waste numbers as required in Permit Attachment B4-3b;
- Information showing that the generator/storage site has assessed the AK process (e.g. internal audits, Permit Attachment B4-3b).

The Permittees shall evaluate the Determination Request for completeness and technical adequacy as specified in Permit Attachment B. If the Permittees provisionally approve the Determination Request, they will forward it along with all information submitted with the Determination Request to NMED for an evaluation of adequacy.

B4-3~~d~~e Requirements for ~~Confirmation of~~ Re-evaluating Acceptable Knowledge Information

Acceptable knowledge includes information regarding the physical form of the waste, the base materials composing the waste, and the process that generates the waste. Waste ~~characterization~~ sampling and analysis (i.e., radiography or visual examination, headspace-gas sampling and analysis, and homogeneous waste sampling and analysis) ~~will~~ may be used to ~~confirm~~ augment acceptable knowledge information. ~~Figure B4-2 illustrates the process the Permittees shall require sites to use to confirm acceptable knowledge.~~

The Waste Stream Profile Form (**WSPF**) and Characterization Information Summary (including the acceptable knowledge summary) will be reviewed for each waste stream prior to Permittee approval of the WSPF. The Permittees review will ensure that the submitted AK information was collected under procedures that ensure implementation of the WAP, provides data sufficient to meet the DQOs in Section B-4a(1), and allow the Permittees to demonstrate compliance with the waste analysis requirements of the Permit. A detailed discussion of the Permittees' waste stream review and approval process is provided in Section B -1d.

~~Acceptable knowledge characterization results shall be confirmed for both retrievably stored and newly generated waste. All retrievably stored waste shall be characterized using radiography or visual examination to confirm the Waste Matrix Code and waste stream and certify compliance with the WAP (Permit Attachment B). If a site must repackage its retrievably stored waste, either the visual examination technique prior to or during waste packaging or radiography (or VE in lieu of radiography) after waste packaging shall be used to confirm acceptable knowledge information.~~

~~For newly generated wastes, sites that elect to confirm AK during packaging of newly generated waste shall have written procedures to document the confirmation of acceptable knowledge information with the visual examination technique prior to or during waste packaging. The following minimum requirements shall be addressed in site-specific procedures:~~

- ~~scope (i.e., waste streams) and purpose;~~
- ~~responsible organization(s);~~

- ~~administrative process controls;~~
- ~~material inputs to process;~~
- ~~process controls and range of operation that affect final hazardous waste characterization;~~
- ~~rate and quantity of the hazardous waste generated;~~
- ~~list of applicable operating procedures relevant to the hazardous waste characterization;~~
- ~~process knowledge verification sampling (i.e., headspace-gas sampling and/or homogeneous waste annual sampling); and~~
- ~~reporting and records management.~~

The Permittees shall require sites to establish procedures for reevaluating acceptable knowledge if the results of waste confirmation indicate that the waste to be shipped does not match the approved waste stream, or if data obtained from radiography or visual examination for waste streams without an AK Sufficiency Determination exhibit this discrepancy ~~results in the assignment of a different Waste Matrix Code [e.g., Plastic/Rubber (S5310) versus Paper/Cloth (S5330)]~~. Site procedures shall describe how the waste is reassigned, acceptable knowledge reevaluated, and appropriate hazardous waste ~~codes~~ numbers assigned. If the reevaluation requires that the ~~a waste must be assigned to a different~~ Waste Matrix Code be changed for the waste stream or the waste does not match the approved waste stream ~~based on radiography or visual examination~~, the following minimum steps shall be taken to reevaluate acceptable knowledge:

- Review existing information based on the container identification number and document all differences in hazardous waste ~~code~~ number assignments
- If differences exist in the hazardous waste ~~codes~~ numbers that were assigned, reassess and document all required acceptable knowledge information (Section B4-3b) associated with the new designation
- Reassess and document all sampling and analytical data associated with the waste
- Verify and document that the reassigned Waste Matrix Code was generated within the specified time period, area and buildings, waste generating process, and that the process material inputs are consistent with the waste material parameters identified during radiography or visual examination
- Record all changes to acceptable knowledge records
- If discrepancies exist in the acceptable knowledge information for the ~~reassigned~~ revised Waste Matrix Code, document the segregation of ~~this container~~ the

affected portion of the waste stream, and define the actions necessary to fully characterize the waste

Potential toxicity characteristics for base materials that compose TRU mixed heterogeneous debris (S5000) waste may be determined without destructive sampling and analysis via acceptable knowledge. Sites will assign a Waste Matrix Code and waste stream to each container of waste using acceptable knowledge. In lieu of ~~confirmatory~~ sampling and analytical or other data to the contrary (including headspace gas and total/TCLP analysis of solids/soils), sites shall assign the toxicity characteristic hazardous waste ~~codes~~ numbers based on the presence of the constituent identified by acceptable knowledge, regardless of the quantity or concentration. ~~Radiography or visual examination shall be used to confirm the Waste Matrix Code and waste stream identified using acceptable knowledge. If the waste stream designation is so detailed that the specific components cannot be differentiated by radiography (e.g., a waste stream based on a specific type of plastic), this waste stream confirmation need not be performed and this omission shall be explained in the auditable record.~~ Procedures shall describe how ~~discrepancies in the Waste Matrix Code are recorded and~~ additions to hazardous waste ~~codes~~ numbers based on material composition are documented, as necessary (Section B4-3b).

~~With the exception of qualifying LANL sealed sources waste containers, headspace-gas sampling and analysis shall be conducted on all TRU mixed waste or randomly selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in Permit Attachment B, Section B-3a(1), to be sent to the WIPP facility. The LANL sealed sources waste containers that meet specified conditions must be assigned VOC concentration values in accordance with Section B-3a(1)(iii). Headspace-gas data will be used to confirm the presence or absence of volatile organic compounds (**VOCs**) identified using acceptable knowledge.~~

The Permittees shall require sites to use acceptable knowledge to identify spent solvents associated with each TRU mixed waste stream or waste stream lot. Headspace-gas data will ~~then~~ be used to ~~confirm acceptable knowledge concerning the presence or absence of F-listed solvents and concentration of applicable toxicity characteristic solvents.~~ resolve the assignment EPA F-listed hazardous waste numbers to debris waste streams when waste streams do not have an AK Sufficiency Determination approved by the Permittees. In this case, sites ~~Sites~~ shall ~~confirm the~~ assign~~ment of~~ F-listed hazardous waste ~~codes~~ numbers (20.4.1.200 NMAC, incorporating 40 CFR §261.31) by evaluating the average concentrations of each VOC detected in container headspace gas for each waste stream or waste stream lot using the upper 90 percent confidence limit (**UCL$_{90}$**). The UCL_{90} for the mean concentration shall be compared to the program required quantitation limit (**PRQL**) for the constituent. If the UCL_{90} for the mean concentration exceeds the PRQL, sites shall reevaluate their acceptable knowledge information and determine the potential source of the constituent. Sites shall provide documentation to support any determination that F-listed organic constituents are associated with packaging materials, radiolysis, or other uses not consistent with solvent use. If the source of the detected F-listed solvents can not be identified, the appropriate spent solvent hazardous waste ~~code~~ number will be conservatively applied to the waste stream. In the case of applicable toxicity characteristic VOCs and non-toxic F003 constituents, generator/storage sites may assess whether the head space gas concentration would render the waste non-hazardous for those characteristics and change the initial acceptable knowledge determination accordingly.

~~Hazardous~~ EPA hazardous waste numbers associated with S3000 and S4000 waste streams will be ~~verified~~ assigned based on the results of the total/TCLP analysis of a representative homogeneous waste sample when waste streams do not have an AK Sufficiency Determination approved by the Permittees. ~~If discrepancies between the results obtained from homogeneous waste sampling and analysis and headspace-gas sampling and analysis exist (i.e., a VOC is detected in the solidified waste but not in the headspace), the most conservative results will be used to verify acceptable knowledge and assign hazardous waste codes, as applicable.~~ As with headspace gas, if the total/TCLP results indicate that the concentration of a characteristic waste or non-toxic constituent of an F003 waste is below regulatory levels, the hazardous waste ~~code~~ number assigned initially by acceptable knowledge may be changed ~~as part of the confirmatory process~~. Otherwise, if an F-listed waste constituent is detected, the appropriate hazardous waste ~~code~~ number shall be applied.

If the ~~confirmatory process~~ site determines that the source of the F-listed constituent is a spent solvent used in the process or is determined to be the result of mixing a listed waste with a solid waste during waste packaging, or applicable toxicity characteristic or non-toxic F003 wastes are present in excess of regulatory levels, then the site will either: 1) assign the applicable listed hazardous waste ~~code~~ number to the entire waste stream, or 2) segregate the drums containing detectable concentrations of the solvent into a separate waste stream and assign applicable hazardous waste ~~codes~~ numbers. Each site shall document, justify, and consistently delineate waste streams and assign hazardous waste ~~codes~~ numbers based on site-specific permit requirements and other state-enforced agreements.

To determine the mean concentration of solvent VOCs, all headspace-gas data ~~and~~ or homogeneous waste data for a waste stream or waste stream lot (i.e., the portion of the waste stream that is characterized as a unit) will be used, including data qualified with a 'J' flag (i.e., less than the PRQL but greater than the method detection limit [**MDL**]) or qualified with a 'U' flag (i.e., undetected). For data qualified with a 'U' flag, sites shall use one-half the MDL in calculating the mean concentration. Because listed wastes are not defined based on concentration, sites may not remove hazardous waste ~~codes~~ numbers assigned using acceptable knowledge if hazardous constituents are not detected in the headspace gas or solids/soil analysis.

TRU mixed headspace gases and homogeneous waste matrices may contain one or two constituents (e.g., carbon tetrachloride and 1,1,1-trichloroethane) at concentrations that are orders of magnitude higher than the other target analytes. In these cases, samples shall be diluted to remain within the instrument calibration range for the elevated constituents. Sample dilution results in elevated MDLs for the constituents with elevated concentrations. Only the concentrations of detected constituents will be used to calculate the mean for the purpose of assigning F-listed hazardous waste ~~codes~~ numbers. Because the presence or absence of F-listed solvents can not be ~~confirmed~~ assigned based on the artificially high MDLs that are caused by sample dilution, data flagged as 'U' and showing an elevated MDL will not be used in calculating the mean concentration.

B4-3~~e~~f Acceptable Knowledge Data Quality Requirements

The data quality objectives for sampling and analysis techniques are provided in Permit Attachment B3. Analytical results will be used to ~~confirm~~ augment the characterization of wastes based on acceptable knowledge. To ensure that the acceptable knowledge process is consistently applied, the Permittees shall require sites to comply with the ~~following~~ data quality requirements for acceptable knowledge documentation in Permit Attachment B3.~~:~~

- ~~Precision - Precision is the agreement among a set of replicate measurements without assumption of the knowledge of a true value. The qualitative determinations, such as compiling and assessing acceptable knowledge documentation, do not lend themselves to statistical evaluations of precision. Therefore, precision requirements are not established for acceptable knowledge.~~

- ~~Accuracy - Accuracy is the degree of agreement between an observed sample result and the true value. The percentage of waste containers which require reassignment to a new Waste Matrix Code and/or designation of different hazardous waste codes based on the reevaluation of acceptable knowledge or on obtaining sampling and analysis data will be reported as a measure of acceptable knowledge accuracy.~~

- ~~Completeness - Completeness is an assessment of the number of waste streams or number of samples collected to the number of samples determined to be useable through the data validation process. The acceptable knowledge record shall contain 100 percent of the information specified in Section B4-2. The useability of the acceptable knowledge information will be assessed for completeness during audits.~~

- ~~Comparability - Data are considered comparable when one set of data can be compared to another set of data. Comparability is ensured through sites meeting the training requirements and complying with the minimum standards outlined for procedures that are used to implement the acceptable knowledge process. All sites shall assign hazardous waste codes in accordance with Section B4.3b and provide this information regarding its waste to other sites who store or generate a similar waste stream.~~

- ~~Representativeness - Representativeness expresses the degree to which sample data accurately and precisely represent characteristics of a population. Representativeness is a qualitative parameter that will be satisfied by ensuring that the process of obtaining, evaluating, and documenting acceptable knowledge information is performed in accordance with the minimum standards established in Section B4-3b. Sites also shall assess and document the limitations of the acceptable knowledge information used to assign hazardous waste codes (e.g., purpose and scope of information, date of publication, type and extent to which waste parameters are addressed and limitations of information in identifying hazardous wastes).~~

Each site shall address quality control by tracking its performance with regard to the use of acceptable knowledge by: 1) assessing the frequency of inconsistencies among information, and 2) documenting the results of~~ acceptable knowledge confirmation through~~ waste discrepancies identified by site during waste characterization or the Permittees during waste examination using radiography,~~ or~~ visual examination,~~ headspace-gas analyses, and homogeneous waste analyses~~ or review of visual examination records. In addition, the acceptable knowledge process and waste stream documentation shall be evaluated through internal assessments by generator/storage site quality assurance organizations~~ and assessments by auditors or observers external to the organization (i.e., DOE/Carlsbad Field Office (**CBFO**), NMED, EPA)~~.

B4-3~~f~~g <u>Audits of Acceptable Knowledge</u>

The Permittees will conduct an initial audit of each site prior to certifying the site for shipment of TRU mixed waste to the WIPP facility. This initial audit will establish an approved baseline that will be reassessed annually by the Permittees. These audits will verify compliance with the requirements specified in the WAP (Permit Attachment B). The audits will be used to verify compliance with the compilation, application, and interpretation requirements of acceptable knowledge information specified in this Permit at all sites, and to evaluate the completeness and defensibility of site-specific acceptable knowledge documentation related to hazardous waste characterization. Permit Attachment B6 gives a description of the overall audit program and a required checklist. Figure B4-~~3~~2 includes the primary steps associated with the audit process of acceptable knowledge.

Site-specific audit plans will be prepared by the Permittees and provided to NMED, and will identify the scope of the audit, requirements to be assessed, participating personnel, activities to be audited, organizations to be notified, applicable documents, and schedule. Audits will be performed in accordance with written procedures and site-specific checklists that will be developed by the Permittees prior to the audit and provided to NMED. The site-specific audit checklists will include items associated with the compilation and evaluation of the required acceptable knowledge information as specified in the checklist required by Permit Attachment B6.

Audit checklists shall include Table B6-3 in Permit Attachment B6, and will include but not be limited to the following elements for review during the audit:

- Documentation of the process used to compile, evaluate, and record acceptable knowledge is available and implemented;
- Personnel qualifications and training are documented;
- All of the required acceptable knowledge documentation specified in Section B4-2 has been compiled in an auditable record;
- All of the required procedures specified in B4-3 have been developed and implemented, including but not limited to:

- A procedure exists for assigning hazardous waste ~~codes~~ numbers to waste streams in accordance with Section B4-3;

- A procedure exists for resolving discrepancies in acceptable knowledge documentation in accordance with Section B4-3;

- ~~A procedure exists for confirming acceptable knowledge information through: a) radiography or visual examination, b) headspace gas sampling and analysis, and c) homogeneous waste sampling and analysis in accordance with Section B4-3;~~ and

- Results of other audits of the TRU mixed waste characterization programs at the site are available in site records.

Members of the audit team will be knowledgeable regarding the required acceptable knowledge information, RCRA regulations and EPA guidance regarding the use of acceptable knowledge for waste characterization, RCRA hazardous waste characterization, and the WAP requirements (Permit Attachment B). Audit team members will be independent of all TRU mixed waste management operations at the site being audited.

Auditors will evaluate acceptable knowledge documentation for at least one waste stream from the Summary Category Group(s) being audited, and will audit acceptable knowledge traceability for at least one container from the audited Summary Category Group(s). For these waste streams, auditors will review all procedures and associated processes developed by the site for documenting the process of compiling acceptable knowledge documentation; correlating information to specific waste inventories; assigning hazardous waste ~~codes~~ numbers; and identifying, resolving, and documenting discrepancies in acceptable knowledge records. The adequacy of acceptable knowledge procedures and processes will be assessed and any deficiencies in procedures documented in the audit report.

Auditors will review the acceptable knowledge documentation for selected waste streams for logic, completeness, and defensibility. The criteria that will be used by auditors to evaluate the logic and defensibility of the acceptable knowledge documentation include completeness and traceability of the information, consistency of application of information, clarity of presentation, degree of compliance with this Permit Attachment with regard to acceptable knowledge ~~confirmation~~ data, nonconformance procedures, and oversight procedures. Auditors will evaluate compliance with written site procedures for developing the acceptable knowledge record. A completeness review will evaluate the availability of all required TRU mixed waste management program information and TRU mixed waste stream information (Section B4-2). Records will be reviewed for correlation to specific waste streams and the basis for characterizing hazardous waste. Auditors will verify that sites include all required information and conservatively include all potential hazardous waste ~~codes~~ numbers indicated by the acceptable knowledge records. All deficiencies in the acceptable knowledge documentation will be included in the audit report.

Auditors will verify and document that sites use administrative controls and follow written procedures to characterize hazardous waste for newly-generated and retrievably stored wastes. ~~Auditors will review procedures used by the sites to confirm acceptable knowledge information~~

~~using radiography or visual examination, headspace gas sampling and analysis, and homogeneous waste sampling and analysis.~~ Procedures to document changes in acceptable knowledge documentation and changes to hazardous waste ~~code~~ number assignments to specific waste streams also will be evaluated for compliance with the WAP (Permit Attachment B).

After the audit is complete, the Permittees will provide the site with preliminary results at a close-out meeting. The Permittees will prepare a final audit report that includes all observations and findings identified during the audit. Sites shall respond to all audit findings and identify corrective actions. Audit results will be included in the final audit report (Permit Attachment B6). If acceptable knowledge procedures do not exist, the required information is not available, or corrective actions (i.e., CARs) are identified associated with acceptable knowledge compilation, ~~acceptable knowledge confirmation,~~ and/or hazardous waste characterization, the Permittees will not manage, store, or dispose TRU mixed waste for the subject waste summary category. Management, storage, or disposal of the subject waste summary category at WIPP will not resume until the Permittees find that all corrective actions have been implemented and the site complies with all applicable requirements of the WAP.

The National TRU Program disseminates information regarding TRU mixed waste characterization requirements and program status through the WIPP Home Page at <http://www.wipp.ws>. The Permittees will use this web page to disseminate information regarding TRU mixed waste streams, RCRA compliance, and operational and programmatic issues, methods development, and waste characterization information, including the application of acceptable knowledge. The Permittees are provided the required waste characterization information prior to management, storage, or disposal of that waste at WIPP and also will conduct audits at least annually. The Permittees will maintain an operating record for review during regulatory agency audits. NMED may also review any information relevant to the scope of the audit during site audits. The Permittees will notify NMED regarding any site's failure to implement corrective actions associated with hazardous waste characterization as specified in Modules I and II and Permit Attachment B3.

~~B4-4 Additional Final Confirmation of Acceptable Knowledge at the WIPP Facility~~

~~The Permittees shall require confirmation of acceptable knowledge characterization designations at the site, as stated in Section B4-3(b). In addition and prior to notifying a site that a waste stream can be managed, stored, or disposed at the WIPP facility, the Permittees will review the Waste Stream Profile Forms, the WIPP Waste Information System (**WWIS**), and associated Characterization Information Summary to ensure that radiography or visual examination, headspace-gas sampling and analysis data, and homogeneous waste sampling and analysis data confirm hazardous waste characterization made using acceptable knowledge. The Permittees shall require all sites to provide all of the required data associated with waste stream characterization, including summary acceptable knowledge information, radiography or visual examination, headspace gas sampling and analysis, and homogeneous waste sampling and analysis results. In addition, sites will designate the assigned hazardous waste codes for the waste stream on the waste profile form. The WWIS and associated Characterization Information Summary will be evaluated as illustrated in Figure B4-2 and compared to the hazardous waste codes specified on the waste stream profile form. The Permittees will review information provided by the sites to ensure that additions to hazardous waste codes are~~

~~identified and justified based on data and that hazardous waste codes are included in the Part A of the WIPP permit application. As part of the reconciliation of data quality objectives (**DQOs**) (Permit Attachment B3, Section B3-11), sites are required to track and report changes to hazardous waste characterizations. If data consistently indicates that discrepancies with acceptable knowledge information were identified at the site level (and were subsequently reconciled), the Permittees will require sites to reassess the materials and processes that generate the waste, and resubmit waste stream profile information and implement their corrective action system. If the Permittees' review of a waste stream profile form and associated waste characterization data reveal nonconformance with acceptable knowledge requirements as described in Permit Attachment B3 (i.e. project level nonconformance), the Permittees shall not manage, store, or dispose of the waste stream until corrective action is taken as specified in Permit Attachment B3. Repeated nonconformances by a site in implementing and documenting WAP requirements (Permit Attachment B) will result in the termination of management, storage, or disposal of the site's waste, waste stream(s), or summary category group(s), as applicable. Management, storage, or disposal of the subject waste summary category at WIPP will not resume until the Permittees find that all corrective actions have been implemented and the site complies with all applicable requirements of the WAP.~~

~~Any drum with unresolved discrepancies associated with hazardous waste characterization will not be managed, stored, or disposed at the WIPP facility until the discrepancies are resolved. The Permittees shall require the sites to reassess the materials and processes that generate the waste, and headspace-gas sampling and analysis, radiography or visual examination, and homogeneous waste sampling and analysis results. All shipments of the subject waste stream will cease until the corrective action(s), as necessary, have been implemented and the discrepancy resolved. The Permittees will notify NMED when the certification status of a waste stream at a site is revoked. Waste characterization and certification authority will not be reinstated until the site demonstrates all corrective actions have been implemented and the program is reassessed by the Permittees.~~

FIGURES

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Figure B4-1
Compilation of Acceptable Knowledge Documentation

~~Figure B4-2~~
~~Confirmation of Acceptable Knowledge~~

Figure B4-~~3~~2
Acceptable Knowledge Auditing

ATTACHMENT B5

QUALITY ASSURANCE PROJECT PLAN REQUIREMENTS

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QUALITY ASSURANCE PROJECT PLAN REQUIREMENTS

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ATTACHMENT B5

QUALITY ASSURANCE PROJECT PLAN REQUIREMENTS

B5-1 Quality Assurance Project Plans

Prior to management, storage, or disposal of a generator/storage site's TRU mixed waste at WIPP, the Permittees shall require that each participating site develops and implements a quality assurance project plan (**QAPjP**) that addresses all the applicable requirements specified in Waste Isolation Pilot Plant waste analysis plan (**WAP**) in Permit Attachment B. The Permittees will approve QAPjPs from all generator/storage sites that intend to send TRU mixed waste to the Waste Isolation Pilot Plant. The Permittees shall ensure that these QAPjPs include the qualitative or quantitative criteria for determining whether waste characterization program activities are being satisfactorily performed. The Permittees shall also ensure that QAPjPs identify the organization(s) and position(s) responsible for their implementation. Additionally, the QAPjPs shall also reference site-specific documentation that details how each of the required elements of the characterization program will be performed.

The Permittees shall ensure that prior to the implementation of characterization activities at participating sites, standard operating procedures (**SOPs**) were developed for all activities which affect the quality of the waste characterization program elements specified in the WAP. For the purposes of the quality assurance program, the term SOP refers to any site-specific implementing document. Compliance with SOPs will ensure that tasks are performed in a consistent manner that results in achieving the quality required for the quality assurance program. The organization, format, content, and designation of SOPs shall be described in the QAPjPs. Site-specific SOPs ~~related to sampling and analysis~~ will be reviewed for consistency with the QAPjP according to the Permittees' Audit and Surveillance Program specified in Permit Attachment B6.

B5-2 Document Review, Approval, and Control

The Permittees shall ensure that the preparation, issuance, and change to documents that specify quality requirements or prescribe activities affecting quality for the transuranic mixed waste characterization program elements specified in the WAP be controlled to assure that correct and current documents are used and referenced. The QAPjPs shall include a document control format consisting of a unique document identification number, current revision number, date, and page number which will be placed on the individual pages of the document. All quality documents for the waste characterization program shall be reviewed prior to approval and issuance by qualified and independent individuals. The QAPjP review shall consider the technical adequacy, completeness, and correctness of the QAPjP, and the inclusion of and compliance with the requirements established by the WAP (Permit Attachment B). The Permittees shall ensure that appropriate QAPjP approval is indicated by a signature and date page included in the front of each document.

At a minimum, the Permittees shall ensure that revisions to documents that implement the requirements of the WAP are denoted by including the current revision number on the document title page, the revised signature page, and each page that has been revised. Only revised pages need to be reissued. Changes to documents, other than those defined as editorial changes or minor changes, shall be reviewed and approved by the same functional organizations that performed the original review and approval, unless other organizations are specifically designated in accordance with approved procedures. Editorial or minor changes may be made without the same level of review and approval as the original or otherwise changed document. The following items are considered editorial or minor changes:

- Correcting grammar or spelling (the meaning has not changed)
- Renumbering sections or attachments
- Updating organizational titles
- Changes to nonquality-affecting schedules
- Revised or reformatted forms, providing the original intent of the form has not been altered
- Attachments marked "Example," "Sample," or exhibits that are clearly intended to be representative only

A change in an organizational title accompanied by a change in the responsibilities is not considered an editorial change. Changes to the text shall be clearly indicated in the document. ~~The Permittees shall provide the QAPjP for each site and all revisions to NMED upon approval by the Permittees.~~

The Permittees shall ensure that QAPjPs include a detailed description of the reporting and approval requirements for changes to approved QA documents and SOPs, including procedures for implementing changes to these documents. All members of the site project staff are responsible for reporting any obsolete or superseded information to the site project manager. All site-specific changes shall be evaluated and approved by the site project manager and the site project QA officer before implementation. The site project manager shall notify the appropriate personnel and the affected documents shall be revised as necessary. The site project manager shall also be responsible for notifying the DOE field office of the changes. The Permittees shall ensure that changes that affect performance criteria or data quality, such as sample handling and custody requirements, sampling and analytical procedures, quality assurance objectives, calibration requirements, or QC sample acceptance criteria comply with the WAP (Permit Attachment B) and shall not be made without prior approval of the Permittees. Prior to shipment of TRU mixed waste, the Permittees shall provide the approved QAPjP for each site, and all approved revisions, to the New Mexico Environment Department.

ATTACHMENT B6

WASTE ISOLATION PILOT PLANT PERMITTEES' AUDIT AND SURVEILLANCE PROGRAM

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ATTACHMENT B6

WASTE ISOLATION PILOT PLANT PERMITTEES' AUDIT AND SURVEILLANCE PROGRAM

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NOTE: TABLES IN ATTACHMENT B6 HAVE NOT BEEN UPDATED TO REFLECT CHANGES PROPOSED IN THE DRAFT PERMIT

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ATTACHMENT B6

WASTE ISOLATION PILOT PLANT PERMITTEES' AUDIT AND SURVEILLANCE PROGRAM

B6-1 Introduction

The Waste Isolation Pilot Plant (**WIPP**) Permittees' Audit and Surveillance Program shall ensure that: 1) the operators of each generator/storage site (**site**) and Permittee approved laboratory that plan to transport transuranic (**TRU**) mixed waste to the WIPP facility conduct sampling and analysis of wastes in accordance with the current WIPP Waste Analysis Plan (**WAP**) (Permit Attachment B), and 2) the information supplied by each site to satisfy the waste screening and acceptability requirements of Section B-4 of the WAP is being managed properly. The Permittees will conduct these audits and surveillances at each site and Permittee approved laboratory performing these activities in accordance with a standard operating procedure (**SOP**). NMED personnel may observe these audits and surveillances to validate the implementation of WAP requirements (Permit Attachment B) at each site and Permittee approved laboratory. Only personnel with appropriate U.S. Department of Energy clearances will have access to classified information during audits. Classified information will not be included in audit reports and records. The audit SOP will contain steps for selecting audit personnel, reviewing applicable background information, preparing an audit plan, preparing audit checklists, conducting the audit, developing an audit report, and following up audit deficiencies. A deficiency is any failure to comply with an applicable provision of the WAP. The checklists for each site and Permittee approved laboratory shall include, at a minimum, the appropriate checklists found in Tables B6-1 through B6-6 for the summary category groups undergoing audit.

B6-2 Audit Procedures

Audit procedures shall establish the responsibilities and methodology for planning, scheduling, performing, reporting, verifying, and closing announced and unannounced audits of sites and Permittee approved laboratories. Records of all audit activities shall be part of the WIPP Operating Record and maintained at the WIPP facility until closure. NMED shall be provided unlimited access to these records.

Approved procedures shall be used to describe audit activities and requirements. Procedures define the responsibilities of specific positions necessary to manage this audit program. The Permittees' manager who oversees the audit program shall ensure that the following tasks are performed:

- Schedule audits
- Designate lead auditor(s)
- Appoint auditor and lead auditor trainees
- Maintain auditor training and qualification records

- Assure that all auditors have been given appropriate training, including training on the WAP
- Assign auditors and lead auditors to perform annual certification audits
- Review and approve final audit reports
- Oversee tracking and closure of all deficiencies and any observations requiring action
- Assure records are entered into the WIPP Operating Record and are properly maintained until facility closure

B6-3 Audit Position Functions

The Permittees will approve lead auditors, auditors, and technical specialists based upon the expertise required for the functions being examined according to the audit scope. The Permittees will supply auditors/technical specialists with expertise in the Resource Conservation and Recovery Act (**RCRA**) requirements and knowledge of the analysis and documentation methods required to verify the hazardous waste characterization performed by the sites. The Permittees shall identify all audit team members to NMED prior to the audit, and shall provide upon request the qualifications of all audit team members.

The lead auditor assigned to be the audit team leader must perform the following tasks:

- Concur that assigned auditors and technical specialists have the collective experience and training commensurate with the scope, complexity, or special nature of the activities to be audited
- Develop an audit plan and coordinate the preparation of an overall checklist to cover the scope of the audit, with consideration given to all nonconformances reported as specified in Permit Attachment B3 and to previous audit results from that site or Permittee approved laboratory
- Assign specific audit areas to individual auditors and technical specialists within their particular specialty and provide guidance on checklist development
- Review individual auditor checklists to assure complete coverage of assigned scope, and approve the checklists
- Conduct the audit at the site or Permittee approved laboratory
- Encourage observers to participate according to the protocol established by the Permittees
- Communicate audit results at the conclusion of the audit, including any deficiencies and observations

- Prepare and sign the audit report
- Maintain complete records of each audit and transfer them to the manager when the audit report is issued

Auditors and technical specialists assigned to the specific audit will report to the audit team leader for supervision and may perform the following tasks:

- Attend any required specific training and team orientation and planning meetings as directed by the audit team leader
- Prepare specific audit checklists to verify that the WAP Quality Assurance Objectives (**QAO**) are met for the areas being audited
- Obtain audit team leader approval of checklist
- Review acceptable knowledge documentation packages, test report data, and documentation of data verification activities
- Obtain and evaluate objective evidence by means of observation, document reviews, or the conduct of interviews with operators, analysts, technicians, and others necessary to determine the adequacy and effective implementation of the WAP
- Conduct inspection tours of waste generating stations, sampling areas and equipment, analytical laboratories, calibration facilities, administrative, and document control/record facility
- Complete checklist during the audit indicating the objective evidence observed verifies that the site or Permittee approved laboratory has met the QAOs for the program elements, methods, and the activities being audited. Add other items to the checklist as they are observed or as needed during the audit
- Prepare narrative statements for all deficiencies, and observations that clearly and concisely identify the conditions involved
- Prepare any portion of the final audit report assigned by the lead auditor.

Audits will be conducted at least annually for each site involved in the waste characterization program. Both announced and unannounced audits will address the following:

- Results of previous audits
- Changes in programs or operations
- New programs or activities being implemented
- Changes in key personnel

For waste characterization processes performed for multiple sites by a single entity (e.g., mobile waste characterization vendors, Permittee approved laboratories), the procedures and processes used by these single entities will be audited at least annually for at least one site. Upon approval, these procedures and processes may be used at any site without requiring an additional audit. At a minimum, the waste characterization processes performed for multiple sites by a single entity will be audited for each site once every three years. In any case, the acceptable knowledge process will be audited at least annually for each site involved in the waste characterization program.

B6-4 Audit Conduct

The conduct of the audit shall commence with an entrance meeting, conducted by the audit team leader, with site or ~~facility~~ Permittee approved laboratory management. At this meeting, the audit objectives and scope, the specific areas to be audited, the processes or functions to be observed, and the site or Permittee approved laboratory-participation required, including site interfaces, will be identified. The purpose of this meeting is to confirm the audit scope, discuss the audit sequence, establish channels of communication, and confirm the daily and exit meeting. Audits shall be performed using approved audit checklists that include the checklists in Tables B6-1 to B6-6 for the summary category groups undergoing audit. Consistency of evaluation shall be ensured before the audit through site or Permittee approved laboratory QAPjP approval (see Permit Attachment B5). QAPjPs for each site or Permittee approved laboratory shall incorporate the same requirements from the WAP. Objective evidence shall be examined (to the depth necessary) to determine if the identified activities, procedures, or QAOs are adequate and are being effectively implemented.

~~Site audits~~ Audits may not include all waste summary category groups, and thus some audit checklists or portions of checklists (Tables B6-1 through B6-6) may not be applicable to some sites or Permittee approved laboratory (e.g., ~~radiography is not used because the site chooses to visually examine all wastes~~ headspace gas sampling and analysis is not used because debris waste is not being analyzed by the site). In these instances, the Permittees shall indicate nonapplicability in the appropriate checklist row, and justify the exclusion under the "Comment" column. In addition, in cases where discrepancies exist between the audit checklists in Tables B6-1 through B6-6 and the Permit, Permit requirements take precedence. The Permittees may add to the checklists as necessary to clarify Permit requirements, but any additions will be clearly designated on the checklists (i.e., redline the additions).

Audits shall include site personnel interviews, document and record reviews, observations of operations, and any other activities deemed necessary by the auditors to meet the objectives of the audit. Observations or deficiencies identified during the audit will be investigated or evaluated, as necessary, to determine if they are isolated conditions or represent a general breakdown of the waste characterization quality assurance program. During audit interviews or audit meetings, site or Permittee approved laboratory personnel may be advised of deficiencies identified within their areas of responsibility to establish a clear understanding of the identified condition.

The site or Permittee approved laboratory personnel will be given the opportunity to correct any deficiency that can be corrected during the audit period. Deficiencies and observations will be documented and included as part of the final audit report. Those items that have been resolved during the audit (isolated deficiencies that do not require a root cause determination or actions to preclude recurrence), will be verified prior to the end of the audit, and the resolution will be described in the audit report. Those items that affect the quality of the program, and/or the data generated by that program, which are required by the WAP will be documented on a Corrective Action Report (**CAR**) and included as a part of the final audit report. The CAR will be entered into the Permittees' CAR tracking system and tracked until closure. RCRA-related items will be uniquely identified within the CAR tracking system so that they can be tracked separately. RCRA-related CARs identified by the site or Permittee approved laboratory during self-audits will be evaluated during the Permittees' audit and surveillance program and tracked in the Permittees' tracking systems.

When a deficiency is identified by the audit team, the audit team member who identified the deficiency prepares the CAR. The Permittees review the CAR, determine validity (assures that a requirement has in fact been violated), classify the significance of the deficiency, assign a response due date, and issue the CAR to the site or Permittee approved laboratory. The site or Permittee approved laboratory reviews the CAR, evaluates the extent and cause of the deficiency, and provides a response to the Permittees indicating the remedial actions and actions taken to preclude recurrence. The Permittees review the response from the site or Permittee approved laboratory and, if acceptable, communicate the acceptance to the site or Permittee approved laboratory. The site or Permittee approved laboratory completes remedial actions and actions to preclude recurrence. After all corrective actions have been completed, the Permittees may schedule and perform a verification visit to assure that corrective actions have been completed and are effective. NMED personnel may participate as observers in these verification visits. When all actions have been completed and verified as being effective, the CAR is closed by the Permittees' manager responsible for quality assurance. As part of the planning process for subsequent audits and surveillances, past deficiencies will be reviewed and the previous deficient activity or process is subject to reassessment.

The sites or Permittee approved laboratories shall submit corrective action plans to eliminate the deficiency stated on the CAR, including a resolution of the acceptability of any data generated prior to the resolution of the corrective action.

The corrective action response will include a discussion of the investigation performed to determine the extent and impact of the deficiency, a description of the remedial actions taken, determination of root cause, and actions to preclude recurrence.

An exit meeting will be conducted by the lead auditor prior to departure of the audit team from the site or Permittee approved laboratory. This meeting will include site or Permittee approved laboratory management personnel, and may include DOE field office personnel. All draft audit results will be presented to the site or Permittee approved laboratory management.

The audit report will be prepared, approved, and issued to the site or Permittee approved laboratory within thirty (30) days of the completion of the audit by the Permittees. NMED shall receive a copy of the audit report upon issuance for information purposes. A formal final audit report will be provided to NMED which will include WAP-related CAR resolution results and audit results that will include, as a minimum, sections describing the scope, purpose, summary of deficiencies, and observations in narrative format, completed audit checklists, audited procedures, and other applicable documents which provide evidence of WAP implementation.

The report will also include an identification of the organization audited, the dates of the audit, and the requested response date. NMED will make the final audit report available for public review and comment. The audited site or Permittee approved laboratory will respond to any deficiencies and observations within thirty (30) days after receipt of any CARs and indicate the corrective action taken or to be taken. If the corrective action has not been completed, the response must indicate the expected date the action will be completed. CARs applicable to WAP requirements shall be resolved prior to waste shipment. Subsequent audits or specific verifications, announced or unannounced, will determine if the corrective action has been satisfactorily implemented. Deficiencies (items corrected during the audit [CDAs] and CARs) and observations will be tracked to completion according to established procedure(s). In addition, deficiencies will be trended to determine if similar situations exist system wide. Trend reports will be issued as necessary to provide a "lessons learned" announcement to other sites or Permittee approved laboratories who might benefit from program improvements implemented as a result of resolutions to the specific situations discovered at the performance of these audits.

The final audit report provided to NMED and audit records will be maintained at WIPP as a part of the Operating Record. These records will be included on the Record Inventory and Disposition Schedule and maintained on-site until closure of the WIPP facility. NMED shall be provided unlimited access to these records.

TABLES

NOTE: TABLES IN ATTACHMENT B6 HAVE NOT BEEN UPDATED TO REFLECT CHANGES PROPOSED IN THE DRAFT PERMIT

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Table B6-1 Waste Analysis Plan (WAP) Checklist

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Waste Analysis Plan (WAP)
General Checklist for use at
DOE'S Generator/Storage Sites

	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	
	WASTE STREAM IDENTIFICATION					
1	Does the generator/storage site define "waste stream" as waste material generated from a single process or activity that is similar in material, physical form, and hazardous constituents? (Waste may be generated as either process or process batch waste streams.) (Attachment B Introduction)					
2	Are procedures in place to ensure that the generator/storage site assigns one of the Summary Category Groups (S3000-homogeneous solids, S4000-Soil~~s~~/Gravel, S5000-debris waste) to each waste stream? (Section B-1b)					
3	Are procedures in place to ensure that the generator/storage site assigns Waste Matrix Code Groups (or Final Waste Forms) (e.g., solidified inorganics, solidified organics, salt waste, soils, combustible, filter, graphite, heterogeneous debris, inorganic nonmetal, lead/cadmium metal waste, uncategorized metal) to each waste stream? (Attachment B Introduction, Section B-1b)					
4	Are procedures in place to ensure that the generator/storage site assigns a Waste Stream WIPP Identifier (ID) to each waste stream? (Section B3-12b(1))					
5	Are procedures in place to ensure that the generator/storage site divides waste streams into waste stream lots if all of the waste within a waste stream is not available for sampling and analysis at one time? If so, is the division of waste streams into waste stream lots based on staging, transportation and handling issues? (Section B-1a)					

	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	
6	Are procedures in place to ensure that the generator/storage site assigns EPA hazardous waste codes associated with the waste? If so, do these assigned EPA hazardous waste codes correspond to the permitted EPA hazardous waste codes on the Part A? Are there any assigned EPA hazardous waste codes that are not permitted EPA hazardous waste codes on the Part A? If so, did the generator/storage site reject the waste for shipment to and disposal at WIPP? Did the generator assign a state hazardous waste code? If so, is it assigned to waste that is permitted at WIPP? (Section B-1b)					
7	Are procedures in place to ensure that Summary Category Groups are defined as follows: S3000- Homogeneous solids or solid process residues, excluding soils, that do not meet NMED criteria for classification as debris and are at least 50 percent by volume solid process residues, or comprise the majority of the waste stream S4000- Waste streams that are at least 50 percent by volume soil/gravel, or comprise the majority of the waste stream S5000- Waste streams that are at least 50 percent volume materials that meet the NMED criteria for debris, or comprise the majority matrix of materials. The criteria for debris are solid materials intended for disposal that exceed 2.36 inch particle size and is a manufactured object, plant or animal matter, or natural geologic material. Particles smaller than 2.36 inches in size may be considered debris if the debris is a manufactured object and if it is not a particle of S3000 or S4000 material. (Attachment B-Introduction)					
8	Does the generator/storage facility have procedures in place to ensure that the following waste analysis parameters will be characterized: C Confirmation of physical form and exclusion of prohibited items C Toxicity characteristic contaminants listed in 20 NMAC 4.1.200 C F-listed, P-listed, and U-listed solvents or wastes in Table B-10 found in 20 NMAC 4.1.200 C Hazardous constituents as included in 20 NMAC 4.1.200 (Section B-2)					

	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	
9	Are procedures in place to ensure that waste streams identified to contain incompatible materials or materials incompatible with waste containers cannot be shipped unless treated to remove the incompatibility? (Section B-1c)					
10	Are procedures in place to ensure that the generator/storage site uses acceptable knowledge, headspace-gas sampling and analysis, radiography (and/or visual examination), and homogeneous waste sampling and analysis as specified in Table B-6? (Section B-3)					
11	Are procedures in place to ensure that waste is characterized in groups or batches, if necessary? (sampling batches of up to 20 samples collected within 14 days of the first sample, analytical batches of up to 20 samples received within 14 days of first sample receipt, and on-line batches collected within 12 hours and analyzed in accordance with the method requirement) (Section B-3)					
	UNACCEPTABLE WASTE					
12	Are procedures in place to ensure that the generator/storage site ensures, through administrative and operational procedures and characterization techniques, that waste containers do not include the following unacceptable waste: C liquid waste (waste shall contain as little residual liquid as is reasonably achievable by pouring, pumping and/or aspirating, and internal containers shall contain less than 1 inch or 2.5 centimeters of liquid in the bottom of the container. Total residual liquid in any payload container may not exceed 1 percent volume of that container. Payload containers with U134 waste shall have no detectable liquid) C non-radionuclide pyrophoric materials C hazardous wastes not occurring as co-contaminants with TRU wastes (non-mixed hazardous wastes) C wastes incompatible with backfill, seal and panel closures materials, container and packaging materials, shipping container materials, or other wastes C wastes containing explosives or compressed gases (continued below)					

	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	
12a	C wastes with polychlorinated biphenyls (PCBs) not authorized under an EPA PCB waste disposal authorization C wastes exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA Hazardous Waste Numbers of D001, D002, or D003) C RH TRU mixed waste (waste with a surface dose rate of 200 millirem per hour or greater) C TRU mixed waste that has ever been managed as high-level waste and waste from tanks specified in Table B-9, unless specifically approved through a Class 3 permit modification and listed in Table II.C.3.i of Module II C any waste container that does not have VOC concentration values reported for the headspace C any waste container which has not undergone either radiographic or visual examination C any waste container from a waste stream which has not been preceded by an appropriate, certified Waste Stream Profile Form (see Section B-1d) (Section B-1c)					
13	Are procedures in place to ensure that the generator/storage site uses radiography, visual examination, headspace gas analysis and, as applicable, solids sampling, to confirm the absence of the unacceptable waste listed above? (Section B-3)					
	WASTE ACCEPTANCE CONTROL					
14	Are procedures in place to ensure that the generator/storage site uses a Waste Stream Profile Form (WSPF) which includes, at a minimum, the information indicated on the attached WSPF found in Figure B-1? A Waste Stream Profile Form need not be submitted for subsequent waste stream lots unless warranted by the characterization information. (Sections B-1a, B-1d)					
15	Are procedures in place to ensure that WSPFs are provided to WIPP and NMED for each waste stream prior to acceptance for disposal at the WIPP? (Section B-1d)					

	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	
16	Are procedures in place to ensure that additional WSPFs are provided to WIPP and NMED for waste streams or portions of waste streams that are reclassified based upon waste characterization information? (Section B-1d)					
	LABORATORY QUALIFICATION					
17	Are procedures in place to ensure that the generator/storage site conduct analyses using laboratories that are qualified through participation in the Performance Demonstration Program (PDP) for headspace gas sampling and analysis, and PDP homogeneous waste sampling and analysis? (Section B-3a(3))					
18	Are procedures in place to ensure that the generator/storage sites conduct analyses using laboratories that implement the analytical methods through laboratory-documented standard operating procedures (SOPs) that ensure that analytical QAOs are met? (Section B-3a(3))					
19	Are procedures in place to ensure that documented laboratory QA/QC programs include the following: C Facility organization C List of equipment/instrumentation C Operating procedures C QA/QC procedures C Quality assurance review C Laboratory records management (Section B-4a(4))					
	GENERAL SAMPLING AND ANALYTICAL REQUIREMENTS					
20	Are procedures in place to ensure that headspace gas sampling and analysis shall be used to: C Determine the types and concentrations of VOCs in the void volume of waste containers C Ensure that there are no adverse worker or public health impacts C VOC constituents shall be compared to those assigned by Acceptable Knowledge and assign hazardous waste codes as warranted (Section B-3a(1))					

	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	
21	Are procedures in place to ensure that each TRU waste container will be sampled and analyzed according to sampling protocols, equipment, and QA/QC methods as specified in Attachment B1 ? (Section B-3a(1))					
22	Are procedures in place to ensure that compounds not on the list of target analytes are reported as tentatively identified compounds (TIC) according to SW-846 TIC identification guidance and that the TIC will be added to the target headspace gas analyte list if it appears in the 20 NMAC 4.1.200 (incorporating 40 CFR Part 261) Appendix VIII list and if they are reported in 25% of the waste containers sampled from a given waste stream? (Section B-3a(1))					
23	Are procedures in place to ensure that a randomly selected set of samples will be collected through core sampling or other EPA approved representative methods from the population of waste containers for homogeneous and soil/gravel waste streams? Are procedures in place that a sufficient number of samples are collected to evaluate the toxicity characteristic of a waste stream at a 90 percent Upper Confidence limit as specified in Attachment B2? (Section B-3a(2))					
24	Are procedures in place to ensure that total analyses or TCLP of VOCs, SVOCs, and Metals are performed on all core samples to determine if the waste exhibits a toxicity characteristic? (Section B-3a(2))					
25	Are procedures in place to ensure that Acceptable Knowledge is used in waste characterization activities to delineate TRU waste streams, to assess whether TRU debris waste exhibits a toxicity characteristic, and to assess whether TRU wastes are listed? (Section B-3b)					
26	Are procedures in place to ensure that radiography and/or visual examination are used to: C Examine every waste container to determine the physical form C Identify liquids and containerized gases C Verify the physical form matches the waste stream description (Section B-3c)					

	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	
27	Are procedures in place to ensure that the following characterization activities shall occur for newly generated wastes: C Acceptable Knowledge for all wastes, with confirmatory: - Either visual examination during packaging or radiography (or VE in lieu of radiography) after packaging for all waste containers, ensuring this occurs prior to any treatment designed to supercompact waste - Headspace gas analysis for all waste containers or randomly selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in Section B-3a(1), except for qualifying waste containers belonging to LANL sealed sources waste streams as specified in Section B-3a(1)(iii) - Total VOC, SVOC, and Metals analyses for a selected number of homogeneous solids and soil/gravel waste containers for control charting purposes (annually thereafter), as specified in Attachment B2 - Evaluation of any TICs found in headspace gas and totals analyses (Section B-3d(1))					
27a	Are procedures in place to ensure that the visual examination during packaging for all waste containers includes the documentation of packaging configuration and rigid liner vent hole presence and diameter necessary to determine the appropriate DAC in accordance with Permit Attachment B1, Section B1-1? (Section B-3d(1))					

	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	
28	Are procedures in place to ensure that the following characterization activities shall occur for retrievably stored wastes: C Acceptable Knowledge for all wastes, with confirmatory: - Visual examination or radiography for all waste containers - Confirmatory visual examination of a statistically determined number of waste containers as specified in Attachment B2 (when radiography is performed) - Headspace gas analysis for all waste containers or randomly selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in Section B-3a(1), except for qualifying waste containers belonging to LANL sealed sources waste streams as specified in Section B-3a(1)(iii) - Total VOC, SVOC, and Metals analyses for a statistically selected number of homogeneous solids and soil/gravel waste containers as specified in Attachment B2 (containers opened for sampling may be used to fulfill the visual examination requirements) - Evaluation of any TICs found in headspace gas and totals analyses (Section B-3d(2))					
29	Are procedures in place to ensure that the following characterization activities shall occur for repackaged waste: C Acceptable Knowledge, with confirmatory: - Either visual examination during repackaging or radiography (or VE in lieu of radiography) after repackaging for all waste containers, ensuring this occurs prior to any treatment designed to supercompact waste - Headspace gas analysis for all waste containers or randomly selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in Section B-3a(1), except for qualifying waste containers belonging to LANL sealed sources waste streams as specified in Section B-3a(1)(iii) - Total VOC, SVOC, and Metals analyses following either the retrievably stored or newly generated waste characterization process, whichever results in greater sampling requirements, unless it is demonstrated that control charting cannot be applied effectively. - Evaluation of any TICs found in headspace gas and totals analyses (Section B-3d, B-3d(1))					

	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	
	DATA GENERATION, VERIFICATION, VALIDATION, DOCUMENTATION, AND QUALITY ASSURANCE					
29a	Are procedures in place to ensure that the visual examination during repackaging for all waste containers includes the documentation of packaging configuration and rigid liner vent hole presence and diameter necessary to determine the appropriate DAC in accordance with Permit Attachment B1, Section B1-1? (Section B-3d(1))					
30	Are procedures in place to ensure that the following Data Quality Objectives are met: C Use Headspace gas sampling and analysis to identify and quantify VOCs to ensure compliance with the environmental compliance standards of 20 NMAC 4.1.500 and to confirm hazardous waste identification by Acceptable Knowledge C Perform totals analyses of homogeneous solids and Soil~~s~~/Gravel wastes to establish if the waste is hazardous based on the toxicity characteristics levels in 20 NMAC 4.1.200 through a comparison of the upper confidence limits (UCL_{90}) of the mean concentrations to confirm hazardous waste characterization by Acceptable Knowledge C Perform totals analyses of homogeneous solids and Soil~~s~~/Gravel wastes to report the average concentration of hazardous constituents in a waste stream as a function upper confidence limits (UCL_{90}) of the mean concentrations, with all averages greater than the MDL considered a detection and subsequent assignment, as applicable, of a hazardous waste code, and as specified in 20 NMAC 2.1.200 to confirm hazardous waste characterization by Acceptable Knowledge C Use radiography or visual examination to verify physical waste form, identify prohibited items, verify determination of sampling and analytical requirements, and to confirm waste stream delineation by Acceptable Knowledge C Use visual examination as a process check of radiography (Section B-4a(1))					

	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	
31	Are procedures in place to ensure that the following Quality Assurance Objectives are adequately defined and assessed for each characterization method: C Precision as a measure of the mutual agreement among multiple measurements C Accuracy as the degree of agreement between a measurement results and a true or known value C Completeness as a measure of the amount of valid data obtained from a method compared to the total amount of data obtained C Comparability as the degree to which one data set can be compared to another data set (Section B-4a(2))					
32	With respect to data generation, are procedures in place to ensure that the generator/storage site's waste characterization program meets the following general requirements: C Analytical data packages and batch data reports must be reported accurately in a pre-approved format, must be maintained in permanent files, and must be traceable? C All data must receive a technical review by another qualified analysts or the technical supervisor, and the laboratory QA officer? C All raw data must be reviewed and have the release signatures of a technical supervisor and a QA officer before release? (Section B-4(a)(4), B-3) Section B3-10)					
33	Are procedures in place to ensure that the generator/storage site performs data validation and verification of waste characterization data for each waste container? (Section B-4)					
34	Are procedures in place to ensure that the generator/storage site has a pre-approved format for reporting waste characterization data? (Section B-4a(4))					

	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	
35	Are procedures in place to ensure that the generator/storage site prepares analytical, testing, and sampling batch data reports to meet the requirements of their own site-specific QAPjP and/or SOPs? (Section B-4a(4))					
36	Are procedures in place to ensure that all raw data is collected and managed at the data generation level in accordance with the following criteria: C All raw data shall be signed and dated in reproducible ink by the individual collecting the data, or signed and dated using electronic signatures C All data shall be recorded clearly, legibly, and accurately in field and laboratory records and include all applicable sample identification numbers C All changes to original data shall be lined out, initialed, and dated by the individual making the change. Original data may not be obliterated or otherwise be made unreadable C All data shall be transferred and reduced from field and laboratory records completely and accurately C All field and laboratory records shall be maintained as specified in Table B-7 of Attachment B C Data shall be organized into standard reporting formats for each method of analysis C All electronic and video data are stored to ensure that waste container, sample and QC data are readily retrievable (Section B3-10a)					

	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	
37	Are procedures in place to ensure that 100 % of batch data reports are subject to non-programmatic technical review by an individual qualified to review the data. The reviewer shall release the data through signature with an associated review checklist prior to characterization of the associated waste and shipment to the WIPP. The review shall ensure the following, as applicable: C Data were generated according to the methods used and reported in the proper units and significant figures C Calculations have been verified by a valid calculation program, a spot check of verified calculation programs, and/or a 100 percent check of all hand calculations C The data have been reviewed for transcription errors C The testing, sampling, and analytical QA documentation is complete and includes raw data, calculation records, chain of custody forms, calibration records, and QC sample results C All QC sample results are within established control limits, and if not, the data has been appropriately qualified C Reporting flags were assigned correctly C Sample holding times and preservation requirements were met, or exceptions documented C Radiography tapes are reviewed on a waste container basis at a minimum of once per testing batch or once per day of operation, whichever is more frequent. The radiography tape will be reviewed against the data on the radiography form to ensure that data are complete and correct (Section B3-10a(1))					

	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	
38	Are procedures in place to ensure that 100 percent of all batch data reports receive a technical supervisory signature release with an associated review checklist prior to characterization of the associated waste and shipment to the WIPP. This release shall ensure the following: C The data are technically reasonable based on the technique used C All data have received non-programmatic technical review C The testing, sampling, and analytical QA documentation is complete and includes raw data, calculation record, chain of custody forms, calibration records, and QC sample results C Sample holding time requirements were met, or exceptions documented C Field Sampling records are complete (Section B3-10a(2))					
39	Are procedures in place to ensure that 100 percent of all batch data reports receive a QA Officer signature release with an associated review checklist prior to characterization of the associated waste and shipment to the WIPP. This release shall ensure the following: C Non-programmatic technical and technical supervisory review have been performed and documented through signature C QAO's have been met C Sampling and QC Checks have been properly performed and all QC outliers have been identified C The testing, sampling, and QA documentation is complete (Section B3-10a(3))					

	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	
40	Are procedures in place to ensure that 100 percent of all batch data reports receive a Site Project Manager signature release with an associated review checklist prior to characterization of the associated waste and shipment to the WIPP. This release shall ensure the following: C The Site Project Manager or designee shall determine the validity of the drum age criteria (**DAC**) assignment made at the data generation level based upon an assessment of the data collection and evaluation necessary to make the assignment. C For LANL sealed sources waste streams, the VOC source term was properly developed and used in accordance with Permit Attachment B, Section B-3a(1)(iii). C Non-programmatic technical reviews, technical supervisory reviews, and QA Officer reviews have been performed and documented through signature C Data have been verified to be within established data assessment criteria and meet all applicable QAOs C Sampling, testing, and analytical batches are complete and data are reported to the correct units, qualifier flags, and significant figures. C The testing, sampling, and QA data review checklists are complete (Section B3-10b(2))					

	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	
41	At the project level, are procedures in place to ensure that 100 percent of all batch data reports shall have a Site Project QA Officer signature release with an associated review checklist prior to characterization of the associated waste and shipment to the WIPP. This release shall ensure the following: C Sampling batch field QC checks were properly performed and meet established QAOs and data usability criteria C Testing batch QC checks were properly performed C Analytical batch and on-line QC Checks were properly performed and meet established QAOs and data usability criteria C Radiography data are complete and acceptable C Data are properly reported (i.e., correct units, correct significant figures, and appropriate qualifier flags) C Proper procedures were used to ensure that representative headspace gas and core samples were collected C For LANL sealed sources waste streams, the quality control provisions for VOC source term development were properly implemented in accordance with Permit Attachment B, Section B-3a(1)(iii). (Section B3-10b(1))					
42	Are procedures in place to ensure that a repeat of the data review process at the data generation level will be performed on a minimum of one randomly chosen waste container every quarter to determine if the verification and validation is performed according to documented procedures? (Section B3-10b)					
43	Are procedures in place and checklists are available to prepare a Site Project QA Officer Summary and a Data Validation Summary (the summaries may be in the same document)? The QA Officer Summary should include a validation checklist for each batch that is of sufficient detail to document all aspects of the testing, sampling, and analytical batch that could affect data quality. The Data Validation Summary should confirm that all data were validated according to site QAPP requirements, indicate analytical batches, identify all problems, and identify all acceptable and unacceptable data. (Section B3-10b(3))					

	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	
44	Are procedures in place to ensure that non-administrative, WAP-related nonconformances first identified at the site project manager level are reported to the Permittees within five (5) calendar days of identification, that nonconformance reports are prepared within thirty (30) calendar days, and that corrective action is implemented prior to waste shipment? (Section B3-1, B3-13)					
45	Are procedures in place to ensure that nonconformances are appropriately identified, reconciled, corrected, and documented? Are nonconformance reports prepared for nonconformances identified? Are nonconformances identified and tracked, and does the site Project QA Officer oversee the nonconformance report process? (Section B3-13)					
	SAMPLE CONTROL					
46	Are procedures in place to ensure that the site's sample handling and control program includes the following: C Field documentation of samples including point of origin, date of sample, container identification, sample type, analysis requested, and chain-of-custody (COC) number? C Proper labeling and/or tagging including proper sample numbering, sample identification, sample date, sampling conditions, and analysis requested? C COC record including name of sample relinquisher, sample receiver, and date and time of sample transfer? and C Proper sample handling and preservation? (Section B-4a(3))					
47	Are procedures in place to ensure that the site's QAPjP or site-specific procedures includes COC forms to control the sample from the point of origin to the final analysis result reporting? (Section B-4a(3))					
	DATA TRANSMITTAL					
48	Are procedures in place to ensure that the generator/storage site transmits data by hard copy or electronic copy from the data generation level to the site project level after all data generation and project level validations are complete? If electronic, does the generator/site have a hard copy available on demand? (Section B-4a(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	
50	Are procedures in place to ensure that the generator/storage site inputs the data into the WWIS manually or electronically? (Section B-4a(6))					
51	Are procedures in place to ensure that the generator/storage site enters the data into the WWIS in the exact format required by the database? (Section B-4a(6))					
51a	Are procedures in place to ensure that if a container was part of a composite headspace gas sample, the analytical results from the composite sample are assigned as the container headspace gas data results, including associated TICs, for every waste container associated with the composite sample in the WWIS? (Section B3-12b(4))					
52	Are procedures in place to ensure all of the data presented on Table B-8 of the Permit is transmitted to the WWIS? (Table B-8)					
53	Are procedures in place to ensure that the generator/storage site reports summarize waste characterization information on a waste stream basis, and transmits the summarized data by hard copy or electronically to WIPP Waste Operations when requested? (Section B-4a(6))					
	RECORDS AND RECORD MANAGEMENT					
55	Are procedures in place to ensure that the generator/storage site's hard copy and/or electronic data reports follow the Permittees format requirements? (Section B-4a(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	
56	Are procedures in place to ensure that hard copy or electronic Waste Stream Profile Form will include the following C Generator/storage site name C Generator/storage site EPA ID C Date of audit report approval by NMED (if obtained) C Original generator of waste stream C Waste Stream WIPP Identification Number C Summary Category Group C Waste Matrix Code Group C Waste stream name C A description of the waste stream C Applicable EPA hazardous waste codes C Applicable TRUCON codes C A listing of acceptable knowledge documentation used to identify the waste stream C The waste characterization procedures used and the reference and date of the procedure C Certification signature of Site Project Manager, name, title, and date signed (Section B3-12b(1))					

	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	
56a	Are procedures in place to ensure that hard copy or electronic Characterization Information Summary will include the following: C Data reconciliation with DQOs C Headspace gas summary data listing the identification numbers of samples used in the statistical reduction, the maximum, mean, standard deviation, UCL_{90}, RTL, and associated EPA hazardous waste codes that must be applied to the waste stream. C For LANL sealed sources waste streams, the VOC source term determination data must comply with Attachment B, Section B-3a(1)(iii). C Total metal, VOC, and SVOC analytical results for homogeneous solids and soil/gravel (if applicable), and demonstration that control charting cannot be applied effectively, if this option is implemented. C TIC listing and evaluation, and verification that acceptable knowledge (**AK**) was confirmed. C Radiography and visual examination summary to document that all prohibited items are absent in the waste and to confirm AK, and documentation and justification for the use of radiography in lieu of or in combination with visual examination/visual examination technique for newly generated waste. C A complete listing of all container identification numbers used to generate the Waste Stream Profile Form, cross-referenced to each Batch Data Report C Complete AK summary, including stream name and number, point of generation, waste stream volume (current and projected), generation dates, TRUCON codes, Summary Category Group, Waste Matrix Code(s) and Waste Matrix Code Group, other TWBIR information, waste stream description, areas of operation, generating processes, RCRA determinations, radionuclide information, all references used to generate the AK summary, and any other information required by Permit Attachment B4, Section B4-2b. C Certification through acceptable knowledge or testing and/or analysis that any waste assigned the hazardous waste number of U134 (hydrofluoric acid) no longer exhibits the characteristic of corrosivity. This is confirmed by assuring that no liquid is present in U134 waste. (Section B3-12b(2))					

	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	
56b	Are procedures in place to assure that ongoing container characterization results are cross referenced to Batch Data Reports? Section B3-12b(2))					
58	Are procedures in place to ensure that project level reports are compiled into Characterization Information Summaries (Section B3-12b)					
59	Are procedures in place to ensure that the generator/storage site uses forms for data reporting that are pre-approved forms in site-specific documentation? (Section B3-12)					
60	Are procedures in place to ensure that the generator/storage site's site project manager submits to the WIPP facility a summary of the waste stream information and reconciliation with data quality objectives (DQOs) once a waste stream is fully characterized? (Section B-4a(6))					
61	Are procedures in place to ensure that the generator/storage site project office completes a WSPF based on the Batch Data Reports? (B3-12b)					
62	Are procedures in place to ensure that the generator/storage Site Project Manager submits the WSPF to the Permittees for approval along with the accompanying Characterization Information Summary for that waste stream? (Section B-4a(6))					
63	Are procedures in place to ensure that the generator/storage site maintains records related to waste characterization sampling and analysis activities in the testing, sampling or analytical facilities files, or site project files for those facilities located on-site? (Section B-4a(7))					
64	Are procedures in place to ensure that the appropriate documented training and indoctrination is performed for all individuals and that procedures are documented in site specific QAPjPs and procedures? (Section B3-14)					
65	Are procedures in place to ensure that the generator/storage site requires contract waste analytical facilities to forward testing, sampling and analytical records along with testing, sampling and analytical batch data reports to the site project office for inclusion in the site central files? (Section B-4a(7))					
66	Are procedures in place to ensure that the generator/storage site has an appropriate records inventory and disposition schedule (RIDS) or equivalent that was prepared and approved by appropriate site personnel? (Section B-4a(7))					

	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	
67	Are procedures in place to ensure that the generator/storage site maintains all records relevant to an enforcement action, regardless of disposition, until they are no longer needed for enforcement action, and then dispositioned per the approved RIDS? (Section B-4a(7))					
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, and then offer those records to the Permittees or transferred to the appropriate Federal Records Center (FRC)? Lifetime Records include: C Field sampling data forms, C Field and laboratory COC forms, C Test facility and laboratory Batch Data Reports, C Waste Stream Characterization Package, C Sampling plans, C Data reduction, validation, and reporting documentation, C Acceptable knowledge documentation, C Data reconciliation report, and C WSPF and Characterization Information Summary (Section B-4a(7), Table B-7)					

	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? Non-Permanent Records include: C Nonconformance documentation, C Variance documentation, C Assessment documentation, C Gas canister tags, C Methods performance documentation, C PDP documentation, C Sampling equipment certifications, C Calculations and related software documentation, C Training/qualification documentation, C QAPjP documentation (all revisions), C Calibration documentation, C Analytical raw data, C Procurement documentation, C QA procedures (all revisions), C Technical implementing procedures (all revisions), and C Audio/video recording (radiography, visual, etc.). (Section B-4a(7), Table B-7)					
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))					

	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	
	SHIPMENT					
72	Are procedures in place to ensure that the generator/storage site accurately completes an EPA Hazardous Waste Manifest prior to shipping the waste to WIPP that contains the following information: C Generator site name and EPA ID C Generator site contact name and phone number C Quantity of waste C List of hazardous waste codes in shipment C Listing of all container IDS C Signature of authorized generator representative (Section B-4b(2))					
73	Are procedures in place to ensure that the generator/storage site accurately completes the following container specific information: C Waste stream identification number C List of hazardous waste codes per container C Certification data C Shipping data (Section B-4b(2))					
74	Are procedures in place to ensure that all applicable waste characterization techniques specified in Attachment B are used by the generator/storage site to delineate the waste on a waste stream basis? (Attachment B Introduction)					

1. The WAP requirements should be presented in documents, such as procedures. Each of the questions posed under WAP requirements are meant to ask whether procedures are in place or whether documents are evident which demonstrate that the specific WAP requirement is or can be met.

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Table B6-2 Solids and Soil~~s~~/Gravel Sampling Checklist

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Solids and Soil~~s~~/Gravel Sampling 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	
	GENERAL SOLIDS SAMPLING REQUIREMENTS					
75	Are procedures documented that adequately ensure: C Newly generated waste streams of homogeneous solid and soil/gravel are randomly sampled for VOC, SVOC, and metals analyses a minimum of once per year after an initial 10 sample set is collected (Section B-3d(1)a) *(Note: only newly generated waste streams associated with waste streams identified as within established administrative controls, or repackaged waste, as appropriate, may be sampled the minimum of once per year)*					
76	Are procedures in place to ensure that the number of newly generated Soil~~s~~/Gravel waste containers to be randomly sampled will be determined using the procedure specified in Section B-3a(2), i.e., performed using the same procedures used to select samples for retrievably stored homogeneous solid and soil/gravel wastes? (Section B-3d(1)(b))					

	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	
77	Are procedures in place to ensure that the following sample collection requirements for retrievably stored waste streams are met: C The number of random samples collected for characterization of retrievably homogeneous solid and soil/gravel stored waste is performed by developing preliminary mean and variance estimates for each analyte to define the number of required random samples; and that the sample selection process is adequately documented. C A minimum of 5 waste containers in a retrievably stored waste streams are sampled to establish the preliminary estimate for the number of samples. C Based on the number of samples required by the preliminary estimate, the subsequent sample means and deviations for each analyte are evaluated against the regulatory threshold for each constituent to determine if additional samples shall be collected. C Samples (the number of which is statistically determined) are collected to verify that a TRU mixed waste is below the regulatory threshold, where the regulatory threshold is the toxicity limit for toxicity characteristics and the PRQL for listed waste constituents. C Samples from preliminary estimates counted as required samples were randomly selected and were collected, analyzed, and validated using representative methods (Section B2-2)					

	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	
78	Are procedures in place that adequately ensure that the following requirements are met for process controls associated with newly generated homogeneous solid waste streams: C Continuous processes associated with newly generated homogeneous solid waste streams are within established and documented administrative controls C Process found not to be within established and documented administrative controls are classified as process batches that will undergo sampling and analysis C Process changes not impacting sampling frequency are justified through memorandum to CBFO waste characterization manager and approved by the Permittees before additional waste from the process is shipped. NMED is notified of this decision C Process parameter bounds are established that define the process operating conditions that would change the hazardous constituents identified in the waste stream or add relevant prohibited materials C Waste generating process procedures shall contain the sections identified in attachment B-3d(1)a C Process records are examined weekly for indications of changes or limit exceedances. NMED will be notified of changes and affected waste will not be accepted at WIPP until follow-up analysis is conducted and appropriate action as specified in Section B-3d(1)(a) is taken C Waste streams that exceed established limits shall be recharacterized and those waste containers will be segregated and a new WSPF and waste generation procedures/bounds will be established (Section B-3d(1)(a))					

	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	
79	Are procedures in place that adequately ensure that the following requirements are met for process controls associated with newly generated homogeneous solid waste streams: C Continuous process verification results are evaluated using SPC control chart techniques to determine fluctuations or significant process changes. (Section B2-4) *(Note: a minimum of 10 data points representative of the process are needed to establish control chart limits)* C Action levels or control limits triggering re-characterization of continuous processes are defined (Section B-3(d)(1)a)) C The sampling requirements necessary to develop an appropriate control chart mean and standard deviation are defined(Section B2-4) C Procedures for re-evaluating and updating control charts are defined (Section B2-4) C Procedures for evaluating the effectiveness of the sample population and frequency are defined (Section B2-4)					
80	Are procedures in place that allow toxicity characteristic contaminants associated with F-Codes for a waste stream to be omitted from sampling requirements so long as that waste is considered listed due to that compound? (Section B2-2a)					
	SOLIDS SAMPLING PROCEDURES					
81	Do procedures ensure that samples for retrievably stored waste are collected using appropriate coring tools or other EPA approved methods, and that newly generated waste may be collected using alternate representative methods in the event coring is inappropriate? (Section B1-2a)					

	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	
82	Do site specific procedures, QAPjPs, and/or SOPs indicate that rotational coring tools are available for the collection of cores and non-rotational coring tools available for collection of cores in relatively soft media. The method used shall be appropriate to retrieve the maximum core amount. The coring tools will include the following features: C Removable tube liners constructed of rigid materials unlikely to affect the composition or concentration of target analytes in the sample (Teflon®) and sufficiently transparent to allow visual examination of the core. The liner outer diameters are between 1-2 inches and the liner wall thickness is less than or equal to 1/16 inch. The liner shall fit flush with the coring tool inner wall and be of sufficient length to allow for a core recovery of greater than 50 percent. C Sleeves composed of polycarbonate, Teflon, or glass for most samples and brass or stainless steel for non-metal samples C Liner endcaps shall fit tightly around the ends of the liner and shall be composed of materials unlikely to affect the composition or concentration of analytes in the sample (Teflon®) C Spring retainers are used when the physical properties of the sampling media may cause the sample to fall out of the liner. The retainer shall be composed of inert materials and the inner diameter shall not be less than the inner diameter of the liner C Coring tools shall have an air lock mechanism . The air lock shall also close when the core is removed from the waste container C Core extruders shall be used to extrude the liner if the liner does not slide freely C Coring tools shall be of sufficient length to hold the liner and shall be constructed to allow placement of the liner leading edge as close as possible to the coring tools leading edge					

	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	
82a	C Rotational coring devices shall have a mechanism to prevent inner liner rotation and shall be designed to minimize frictional heat transfer to the sample core C The leading edge of the coring tool is sharpened and tapered to a diameter equivalent or slightly smaller than the inner diameter of the liner. C Non-Rotational devices shall be designed to minimize the kerf width (½ the difference between the outer diameter and the inlet inner diameter) (Section B1-2a(1))					
83	Does the site adequately document that the liner material and retainers are not likely to contain any analytes of concern? (Section B1-2a(1))					
84	Are procedures in place to ensure that equipment blanks are collected and evaluated to verify that liner material, retainers, or other sampling equipment in contact with the sample do not contain analytes of concern? (Section B1-2b(2))					
	SAMPLE COLLECTION					
85	Are procedures in place to ensure that sampling is completed in a timely manner, within 60 minutes of core collection, or that the core shall remain in the capped liner, or the coring tool shall remain in the waste container with the air lock mechanism attached? (Section B1-2a(2))					
86	Are procedures in place to ensure that VOC samples are sampled prior to extruding the core from the liner and that the sample locations are documented? These sample may be collected by choosing a single sample from the representative subsection of the core, or three equal length VOC sample locations on the core are selected randomly along the long axis of the core to form a single 15-gram composite sample. Smaller sample sizes may be used if method PRQL requirements are met for all analytes. (Section B1-2a(2))					
87	Are procedures documented to ensure that a VOC sample is collected using a metal coring cylinder or equivalent equipment as described in SW-846 and that the sample is immediately extruded into a 40 mL VOA vial (or other containers specified in appropriate SW-846 methods)? (Section B1-2a(2))					

	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	
88	Are procedures in place to ensure that SVOC and Metals sample location(s) on the core are selected randomly along the long axis of the core and that the sample locations are documented, or that samples are collected at the same locations as VOC samples? Samples may be collected by splitting or compositing the representative subsection of the core. The representative subsections are chosen by randomly selecting a location along the portion of the core from which the sample was taken. (Section B1-2a(2))					
89	Are procedures in place to ensure that the SVOC and Metals sample s are collected using equipment constructed of materials unlikely to affect the composition or concentrations of the samples? (Section B1-2a(2))					
90	Are procedures in place to ensure that samples collected by means other than coring are collected as soon as possible and that spatial and temporal homogeneity is evaluated to determine if composite or grab samples are appropriate? (Section B1-2a(2))					

	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	
91	Are procedures in place to ensure sample volumes, preservatives, containers, and holding times meet the following specifications: **Minimum sample quantity** VOC 15 grams SVOC 50 grams Metals 10 grams (smaller sample sizes may be used if method PRQL requirements are met) **Preservative** VOC Cool to 4C SVOC Cool to 4C Metals Cool to 4C **Sample Container** VOC 40 mL VOA glass vial (or other appropriate containers) with septum cap SVOC 250 mL amber glass jar with Teflon© lined cap Metals 250 mL polyethylene or polypropylene bottle **Holding Time from Date of Collection** VOC 14 days prep/40 days analyze SVOC 14 days prep/40 days analyze Metals 180 days/ 28 days Hg (Table B1-4)					
	QUALITY CONTROL SAMPLE COLLECTION					
92	Are procedures in place to ensure that sampling precision will be determined through the collection of co-located core field duplicate samples for core samples and through the collection of co-located samples for samples collected using alternate methods at the frequency of once per 20 sample batch collected over 14 days? Are procedures in place to ensure that acceptance criteria for sample precision is established through an F-Test until 20 - 30 co-located pairs have analyzed to establish a control chart? (Section B1-2b(1))					
93	Are procedures in place to ensure that co-located cores are collected side by side as close as feasible to each other, that the cores are collected and handled in the same manner? (Section B1-2b(1))					

	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	
94	Are procedures in place to ensure that an additional sampling location is found or new co-located cores are collected if the visual examination of the original co-located cores detects inconsistency in the sample color, texture, or waste type? (Section B1-2b(1))					
95	Are procedures in place to ensure that all surfaces of sampling tools that have the potential to come into contact with the sample, including tube liners, endcaps, spring retainers, extruders, coring tool surfaces, or any other sampling equipment, are either thoroughly decontaminated or disposed of after each sampling event? (Sections B1-2b(2), B1-2b(3))					
96	Are procedures in place to ensure that equipment blanks are collected from randomly selected fully assembled coring tools or randomly selected liners (if they are cleaned separately) and from randomly selected sampling equipment (e.g. VOC subsampler, spoons, bowls) at a frequency of once per equipment cleaning batch and that the sample is collected prior to first use? (Section B1-2b(2))					
97	Are procedures in place to ensure that equipment blanks will be collected in the area where sampling equipment coring tools are cleaned, prior to covering the coring tools with protective wrapping and storage? (Section B1-2b(2))					
98	Are procedures in place to ensure that coring tool equipment blanks will be appropriately collected? (Section B1-2b(2))					
99	Are procedures in place to ensure that miscellaneous sampling tool equipment blanks will be collected by passing deionized or HPLC water over the surface of the equipment and into a clean sample container appropriate for the requested analysis? (Section B1-2b(2))					
100	Are procedures in place to ensure that equipment blanks are analyzed for VOC, SVOC, and Metals and that the entire equipment batch will be re-cleaned and re-sampled if any analytes are detected at levels greater than 3 times the MDL or PRDL (Section B1-2b(2))					
101	Are procedures and processes in place to ensure that equipment blanks are traceable to a specific equipment cleaning batch and that the equipment cleaning batch is traceable to specific identified sampling equipment? Are sampling equipment or coring tools labeled with unique identification numbers that are referenced in field records? (Section B1-2b(3))					

	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	
102	Are procedures in place to ensure that disposable sampling equipment is certified as clean prior to use? (Section B1-2b(2))					
	SAMPLE EQUIPMENT TESTING, INSPECTION AND MAINTENANCE					
103	Are procedures in place to ensure that all coring tools are tested prior to use in accordance with manufacturers specification to ensure that the air-lock mechanism and rotation mechanism are in working order? (Section B1-2c)					
104	Are procedures in place to ensure that malfunctioning sampling equipment or coring tools are tagged; and repaired or replaced prior to use? (Section B1-2c)					
105	Are procedures in place to ensure that all equipment is cleaned, sealed inside a protective wrapping and stored in a clean area? (Section B1-2c)					
106	Are procedures in place to ensure that an adequate spare part inventory is available? (Section B1-2c)					
107	Are procedures in place to ensure that all equipment maintenance and repair is documented in field records and that field record logbooks are available to document equipment maintenance and repair activities? (Section B1-2c)					

	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	
108	Are procedures in place to ensure that inspection of equipment and work area cleanliness will encompass the following: C Sample collection equipment in the immediate area of sample collection shall be inspected daily for cleanliness and that any visible contamination that has a potential to contaminate a waste sample shall be thoroughly cleaned upon discovery C The waste coring and sampling work areas shall be maintained in clean condition C Expendable supplies and equipment shall be visually inspected for cleanliness prior to use and properly discarded after use C Protective wrapping on coring tools and other sampling equipment are visually inspected prior to unwrapping. Coring tools or other equipment with torn protective wrappers or with visible contamination are returned to be cleaned prior to use. C All sampling equipment shall be visually inspected prior to use to determine if protective wrapping is torn or if equipment is contaminated after unwrapping. Equipment with torn wrapping or signs of contamination will be returned for cleaning. C Clean equipment is segregated from equipment that has not been decontaminated. (Section B1-2c)					
109	Are procedures documented to ensure that scales used for weighing sub-samples are calibrated on an annual basis, that the calibration is documented, that calibration is verified using NIST traceable weights upon each day of use, and that all calibration verification is documented in field records? (Section B1-2d)					
	SAMPLE HANDLING AND CUSTODY					
110	Are procedures in place that adequately ensure that field log, sample labels, and Chain of Custody Records are completed in a manner that meets accepted standards for legal defensibility and admissibility (Section B1-4)					

	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	
111	Do formats for field logs and custody records specify documentation of the following information: C Name of sampling facility C Waste container identification number C Sample identification number of each sample referenced to waste container C Sample matrix C Time and date of sample collection C Type/number and size of sample container(s) C Method of sample preservation C Requested analyses C Analytical laboratory C Shipping information (date, time, shipper, mode, air bill or lading number) C Sampler(s) name through signature					
111a	C Signatures of custodians relinquishing and receiving custody of samples including date and time of transfer until time of final disposition C Comments pertinent to sampling activities (Section B1-4)					
112	Are procedures in place to ensure that waste containers are sequentially and uniquely numbered by site and within the site? (Section B1-4)					

	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	
113	Do sample tags or labels contain the following information: C Sample ID number C Sampler initials and organization C Ambient temperature and pressure (for gas samples only) C Sample description C Requested analysis C Date and time of collection C QC designation (if applicable) (Section B1-4)					
114	Are procedures in place to ensure waste containers and samples are sealed with intact custody seals and that one or more of the following custody conditions are met: C It is in the possession of an authorized individual C It is in the view of an authorized individual, after being in the possession of that individual C It was in the possession of an authorized individual and access to the sample was controlled by locking or placement of signed custody seals that prevent undetected access C It is in a designated secure area, such as a controlled access location with complete documentation of personnel access or a radiological containment area (hot cell or glove box) (Section B1-4)					
115	Are procedures in place to ensure that discrepant sample information, indications of damage, or indications of tampering are documented in a non-conformance report? (Section B1-4)					

	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	
116	Are procedures in place to ensure that custody information will be maintained in accordance with EPA NEIC guidance? (Section B1-4)					
117	Are procedures in place to ensure that sample custody is maintained until the following conditions are met: C Sample analyses are completed and data has been validated at the project level, and C The sample is expended or removed from the Program (Section B1-4)					
118	Are procedures in place to ensure that samples are wrapped in plastic to prevent breakage and placed in appropriate containers, such as coolers, for shipment? (Section B1-5)					
119	Are procedures in place to ensure that adequate cold packs are included in the sample shipping container to ensure that all temperature requirements are met? (Section B1-5)					
120	Are procedures in place to ensure that sample COC forms are secured for shipment to the inside of the sealed and locked shipping container lid and that samples and shipping containers are affixed with tamper proof seals? (Section B1-5)					
121	Are procedures in place to ensure that a blank consisting of organic free water is included with each shipment container containing VOC samples? (Section B1-5)					
122	Are procedures in place to ensure that a custody seal or device is securely affixed across the lid and body of each sample and shipment container, and is traceable to the individual who affixed the seal or device? (Section B1-5)					
	LABORATORY OPERATIONS					
123	Are procedures in place to ensure that only laboratories that are qualified through participation in the Performance Demonstration Program are eligible to analyze waste samples? (Section B-3a(3))					
124	Are procedures available from all participating laboratories that adequately document that custody is maintained until the sample is released by the site project manager or until the sample is expended? (Section B1-4)					

	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	
	VOLATILE AND SEMI-VOLATILE ANALYSIS OF CORE SAMPLES					
125	Are procedures documented to ensure that all VOC and SVOC analyses are evaluated using the following criteria: C Validity of analysis is assessed through evaluation of GC/MS tune and calibration requirements using criteria in Table B3-5 (VOCs) or Table B3-7 (SVOCs) and SW-846 methods C Precision is assessed through evaluation of laboratory duplicates or matrix spike duplicates, LCS replicates, and PDP blind audit samples in comparison to Table B3-5 or Table B3-7 C Accuracy is assessed through evaluation of LCS samples, Matrix spikes, blind PDP audit samples, and surrogate analysis in comparison to criteria in Table B3-5 or Table B3-7 C Laboratory completeness shall be expressed as the number of samples analyzed with valid results as a percent of the total number of samples collected. C Comparability is assessed through use of standardized SW-846 methods for preparation and analysis that meet the QAOs and the consistent application of data useability criteria C Representativeness is assured through the use of unbiased sample collection and preparation methods C Results and method detection limits are expressed in Mg/Kg C All method detection limits and program required quantitation limits shall be less than or equal to the limits listed in Table B3-4 or Table B3-6 and the detection limit study procedures shall be documented in laboratory SOPs (Section B3-6)					

	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	
126	Are procedures documented to ensure that Tentatively Identified Compounds shall be added to the target compound list if they are reported in 25% of the waste containers sampled in accordance with SW-846 criteria for a given waste stream, if they are not a listed waste constituent attributable to waste packaging or radiolysis (with the exception of non-toxic F003 constituents), and if they appear in the 20 NMAC 4.1.200 (incorporating 40 CFR §261) Appendix VIII list? (Section B-3a(1))					
126a	Are procedures documented to ensure that the following criteria are met with regard to the recognition and reporting of TICS for GC/MS Methods for homogeneous solids and soils and gravels: C Relative intensities of major ions in the reference spectrum (ions greater than 10% of the most abundant ion) should be present in the sample spectrum. C The relative intensities of the major ions should agree within ± 20 percent. C Molecular ions present in the reference spectrum should be present in the sample spectrum. C Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds. C Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks. C The reference spectra used for identifying TICs shall include, at minimum, all of the available spectra for compounds that appear in the 20.4.1.200 NMAC (incorporating 40 CFR Part 261) Appendix VIII list. The reference spectra may be limited to VOCs when analyzing headspace gas samples. C TICs for headspace gas analyses that are performed through FTIR analyses shall be identified in accordance with the specifications of SW-846 Method 8410. (Section B3-1)					

	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	
126b	TICs shall be reported as part of the analytical batch data reports for GC/MS Methods in accordance with the following minimum criteria: C a TIC in an individual container headspace gas or solids sample shall be reported in the analytical batch data report if the TIC meets the SW-846 identification criteria listed above and is present with a minimum of 10% of the area of the nearest internal standard. (Section B3-1)					
	METALS ANALYSIS OF CORE SAMPLES					
127	Are procedures in place to ensure that all Metals analyses are evaluated using the following criteria: C Validity of analysis is assessed through evaluation of ICP/MS tune and/or calibration requirements using criteria in Table B3-9 and SW-846 methods C Precision is assessed through evaluation of laboratory duplicates or matrix spike duplicates, LCS replicates, and PDP blind audit samples in comparison to Table B3-9 C Accuracy is assessed through evaluation of LCS samples, Matrix spikes, and blind PDP audit samples in comparison to criteria in Table B3-9 C Instrument detection limits are expressed in ug/L and results are listed in Mg/Kg. C All instrument detection limits and program required detection limits shall be less than the limits listed in Table B3-8 and the detection limit study procedures shall be documented in laboratory SOPs. The Instrument detection limits shall be less than the associated PRDL for each analyte *(This requirement is not mandatory if the sample concentrations are greater than 5 times the instrument detection limit (IDL) for a method)* C Instrument detection limits shall be determined semiannually using procedures documented in laboratory SOPs					

	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	
127a	C Laboratory completeness shall be expressed as the number of samples analyzed with valid results as a percent of the total number of samples collected. C Comparability is assessed through use of standardized SW-846 methods for preparation and analysis that meet the QAOs and the consistent application of data useability criteria C Representativeness is assured through the use of unbiased sample collection and preparation methods C Results and method detection limits are expressed in Mg/Kg dry weight (Section B3-8)					
	QUALITY ASSURANCE OBJECTIVES					
128	Are procedures in place to ensure that the sample completeness rate is expressed as the number of valid samples collected as a percentage of the total samples collected? The rate must be greater than 90 percent for all compounds in a waste stream (Table B3-4, Table B3-6, and Table B3-8) and corrective action taken if the completeness rate does not meet 90 percent. (Section B3-3)					
129	Are procedures in place to ensure that sampling operations are comparable through the use of standardized procedures, sampling equipment, and measurement units? (Section B3-3)					
130	Are procedures in place to ensure that sampling precision shall be determined through the collection of field duplicates at a rate of 1 per sampling batch (up to 20 samples) or 1 per week, whichever is more frequent? (Section B3-3)					
131	Are procedures in place to ensure that the variance measured between co-located core samples is compared to the variance within the waste stream using the F-test and is reported by the site project QA officer on a routine basis? (Section B3-3)					
132	Are procedures in place to ensure that sampling accuracy as a result of equipment blank evaluation is determined through the collection of equipment blanks at a frequency of once per equipment cleaning batch (Section B3-3)					

	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	
133	Are procedures in place to ensure that the representativeness of samples is demonstrated through the following requirements: C Use of coring tools and sampling equipment that are clean prior to use C The entire depth of the waste minus a documented safety factor shall be cored and the core collected shall have a core recovery of greater than 50 percent C The core recovery is calculated as the length of the core collected over the depth of the waste in the container C Coring operations and tools shall be designed to minimize alteration of the in-place waste characteristics and the minimum alteration shall be documented by visually examining the core and documenting the observation in field logbooks *(Note: if core recovery is less than 50 percent, a second core shall be randomly selected. The core with the best recovery shall be used as the sample location regardless of the second core recovery)* (Section B3-3)					

1. The WAP requirements should be presented in documents, such as procedures. Each of the questions posed under WAP requirements are meant to determine whether procedures are in place or whether documents are evident which demonstrate that the specific WAP requirement is or can be met.

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Table B6-3 Acceptable Knowledge (AK) Checklist

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Acceptable Knowledge (AK) Checklist[1]

	WAP Requirement[2]	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	
	GENERAL REQUIREMENTS					
134	Are the primary document(s) required in Permit Attachment B4 containing acceptable knowledge information available? (Section B4-2)					
135	Has the generator developed a methodology whereby a logical sequence of acceptable knowledge information that progresses from general facility to more detailed waste-specific information can be acquired? (Section B4-2)					
136	Does the site have adequate procedures in place to ensure that the Acceptable Knowledge process is adequately implemented? Do these procedures facilitate the mandatory traceability analysis performed for each Summary Waste Category Group examined during the audit? (Section B4-2)					
137	Does the generator site's TRU mixed waste management program information clearly define (or provide a methodology for defining) waste categorization schemes and terminology, provide a breakdown of the types and quantities of TRU mixed waste generated/stored at the site, and describe how waste is tracked and managed at the generator site (including historical and current operations? Do procedures ensure that waste streams are adequately identified? (Section B4-2a)					
138	Does site documentation procedures indicate that the site will document, justify, and consistently define waste streams and assign EPA hazardous waste numbers? (Section B4-2b)					
139	Are procedures in place to ensure that the generator/storage site initially characterizes the waste on a waste stream basis using Acceptable Knowledge? If the Acceptable Knowledge information does not meet the requirements of Attachment B4, is the waste characterized in the same manner as a newly generated waste? (Section B-1a)					

	WAP Requirement[2]	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	
	REQUIRED AND SUPPLEMENTAL INFORMATION					
140	Does the generator site document that the following must be included in the acceptable knowledge record: C Map of the site with the areas and facilities involved in TRU waste generation, treatment, and storage identified C Facility mission description as related to TRU waste generation and management (e.g., nuclear weapons research may involve metallurgy, radiochemistry, and nuclear physics operations that result in specific waste streams) C Description of the operations that generate TRU waste at the site (e.g., plutonium recovery, weapons design, or weapons fabrication) C Waste identification or categorization schemes used at the facility (e.g., item description codes, content codes) C Types and quantities of TRU mixed waste generated, including historical generation through future projections C Correlation of waste streams generated from the same building and process, as appropriate (e.g., sludge, combustibles, metals, and glass) C Waste certification procedures for retrievably stored and newly generated wastes to be sent to the WIPP facility (Section B4-2a)					

	WAP Requirement[2]	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	
141	Does the generator site document that the following shall be collected for each waste stream: C Area(s) and/or building(s) from which the waste stream was or is generated C Waste stream volume and time period of generation (e.g., 100 standard waste boxes of retrievable stored waste generated from June 1977 through December 1977) C Waste generating process described for each building (e.g., batch waste stream generated during decommissioning operations of glove boxes), including processes associated with U134 waste generation, if applicable. C Process flow diagrams (e.g., a diagram illustrating glove boxes from a specific building to a size reduction facility to a container storage area). In the case of research/development and analytical laboratory waste, a description of the waste generating processes, rather than a formal process flow diagram, may be included if this modification is justified and the justification is placed in the auditable record C Material inputs or other information that identifies the chemical and radionuclide content of the waste stream and the physical waste form (e.g., glove box materials and chemical handled during glove box operations; data obtained through visual examination of newly generated waste that later undergoes radiography; information demonstrating neutralization of U134 [hydrofluoric acid] and waste compatibility, etc.) (Section B4-2b)					
142	Do site documents/procedures confirm that the facility will provide a summary to the Permittees and NMED that summarizes all information collected, including basis and rationale for all waste stream designations? Is an example of this summary available for audit review? If discrepant hazardous waste data exist in required information, do sites assign all hazardous waste codes unless the sites choose to justify otherwise? (Section B4-2b)					
143	Do site procedures indicate that the required AK information is not available for a retrievably stored waste stream, supplemental information will be acquired and this waste stream shall be designated as newly generated and characterized accordingly? (Section B4-2)					

	WAP Requirement[2]	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	
144	Have the following procedures been prepared?: C Procedures for identifying and assigning the physical waste form C Procedures for delineating waste streams and assigning Waste Matrix Code C Procedures for resolving inconsistencies in acceptable knowledge documentation C Procedures for confirming acceptable knowledge information through headspace gas sampling and analysis, visual examination and/or radiography, and homogeneous waste sampling and analysis C Procedures describing management controls used to ensure prohibited items (specified in the WAP, Permit Attachment B) are documented and managed C Procedures to ensure radiography and visual examination include a list of prohibited items that the operator shall verify are not present in each container of waste (corrosives, ignitables, reactives, and incompatible wastes) C Procedures to document how changes to Waste Matrix Codes, waste stream assignment, and associated EPA hazardous waste numbers based on material composition are documented for any waste C Procedures for newly generated waste shall describe how acceptable knowledge is confirmed using either the visual examination technique or radiography (or VE in lieu of radiography). Procedures shall also describe the criteria for selecting either radiography or VE to ensure there is documentation and adequate justification of the process selected (Section B4-2b)					
145	Does the generator provide procedures or written commitment to collect supplemental acceptable knowledge information, as available and as necessary to supplement mandatory information? (Section B4-2c)					

	WAP Requirement[2]	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	
145a	For waste containers that belong to LANL sealed sources waste streams and meet the criteria of Section B-3a(1)(iii) are there procedures in place to assure the collection of the following supplemental AK?: C Documentation that the waste container contents meet the definition of sealed sources per 10 CFR §30.4 and 10 CFR §835.2 (effective January 1, 2004) C Documentation of the certification of the sealed sources as U.S. Department of Transportation Special Form Class 7 (Radioactive) Material per 49 CFR §173.403 (effective October 1, 2003) C Documentation of contamination survey results that validate the integrity of each sealed source per 10 CFR §34.27 (effective January 1, 2004). C AK documentation does not indicate the use of VOCs or VOC-bearing materials as constituents of the sealed sources. C The outer casing of each sealed source must be of a non-VOC bearing material, which must be verified using the VE technique at the time of packaging. C Documentation that includes but is not limited to, as available and as necessary to determine the hazardous constituents associated with sealed sources, the following: source manufacturer's sales catalogues, original purchase records, source manufacturer's fabrication documents, source manufacturer's drawings, source manufacturer's fuel capture assembly reports, source manufacturer's operational procedures for cleanliness requirements, source manufacturer's shipping documents, source manufacturer's welding records, transuranic batch material records, and information from national databases (e.g., NMMSS). All of this information may not and need not be available for each source, but sufficient information must be included in the auditable record to derive an adequate understanding of source construction and history to ensure that no VOCs are present in association with the sealed source itself that would render the source hazardous. If AK data indicate that assignment of a hazardous waste number related to organic materials is required in association with a source, this specific source will be subject to headspace gas sampling. (Section B4-2c)					
146	Does the generator site document that all specific, relevant supplemental information used in the acceptable knowledge process will be identified and its use explained? Is all necessary supplemental information assembled and has it been appropriately used? (Section B4-2c)					

	WAP Requirement[2]	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	
147	Does the generator site discrepancy analysis documentation (for acceptable knowledge supplemental and required documentation) indicate that if discrepancies are detected, site must include all hazardous waste codes indicated in the required and supplemental information unless the site chooses to justify an alternative assignment and document justification in the auditable record? (Section B4-2c)					
	TRAINING					
148	Does the generator site have procedures to ensure that all personnel involved with acceptable knowledge waste characterization have the following training, and is this training documented? C WIPP WAP and TSDF Waste Acceptance Criteria Requirements C State and Federal RCRA regulations associated with solid and hazardous waste characterization C Discrepancy resolution and reporting C Site-specific procedures associated with waste characterization using acceptable knowledge (Section B4-3a)					

	WAP Requirement[2]	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	
	PROCEDURES					
149	Has the generator site developed the following procedures, and are these procedures technically sufficient? C Sites must prepare and implement a written procedure outlining the specific methodology used to assemble acceptable knowledge records, including the origin of the documentation, how it will be used, and any limitations associated with the information (e.g., identify the purpose and scope of a study that included limited sampling and analysis data). C Sites must develop and implement a written procedure to compile the required acceptable knowledge record. C Sites must develop and implement a written procedure that describes the waste certification program and ensures unacceptable wastes (e.g., reactive, ignitable, corrosive) are identified and segregated from certifiable TRU waste populations. C Sites must prepare and implement a written procedure to evaluate acceptable knowledge and resolve discrepancies. If different sources of information indicate different hazardous wastes are present, then sites must include all sources of information in its records and conservatively assign all potential hazardous waste codes, unless the site chooses to justify an alternative assignment and document the justification in the auditable record.					

	WAP Requirement[2]	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	
149a	C Sites must prepare and implement a written procedure in compliance with Section B4-3(d) to identify hazardous wastes and assign the appropriate hazardous waste codes to each waste stream. The following are minimum baseline requirements/standards that site-specific procedures must include to ensure comparable and consistent identification of hazardous waste: - Compile all of the required information in an auditable record. - Review the required information to determine if the waste is listed under 40 CFR Part 261, Subpart D. Assign all listed hazardous waste codes, unless the site chooses to justify an alternative assignment and document the justification in the auditable record. - Review the required information to determine if the waste may contain hazardous constituents included in the toxicity characteristics specified in 40 CFR Part 261, Subpart C. If a toxicity characteristic contaminant is identified and is not included as a listed waste, assign the toxicity characteristic code, unless data are available which demonstrates that the concentration of the constituent in the waste is less than the toxicity characteristic regulatory level. When data are not available, the toxicity characteristic hazardous waste code for the identified hazardous constituent must be applied to the mixed waste stream. - For newly generated waste, procedures shall be developed and implemented to characterize mixed waste using acceptable knowledge prior to packaging.					

	WAP Requirement[2]	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	
149b	C Sites must develop and implement a written procedure for the confirmation of acceptable knowledge in accordance with Section B4-3(d). C Sites must prepare and implement a written procedure that provides a cross reference to the applicable waste summary category group (i.e., S3000, S4000, and S5000) to verify all of the required confirmation data has been evaluated and the proper hazardous waste codes have been assigned. C Sites shall ensure that results of other audits of the TRU mixed waste characterization programs at the site are available in the records. A reference list must be provided that identifies documents, databases, Quality Assurance protocols, and other sources of information that support the acceptable knowledge information. (Section B4-3b)					
150	Does the site have implemented procedures which comply with the following criteria to establish acceptable knowledge records: C Acceptable knowledge information shall be compiled in an auditable record, including a road map for all applicable information. C The overview of the facility and TRU mixed waste management operations in the context of the facility's mission shall be correlated to specific waste stream information. C Correlations between waste streams, with regard to time of generation, waste generating processes, and site-specific facilities shall be clearly described. For newly generated wastes, the rate and quantity of waste to be generated shall be defined. C A reference list shall be provided that identifies documents, databases, Quality Assurance protocols, and other sources of information that support the acceptable knowledge information. (Section B4-3c)					

	WAP Requirement[2]	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	
151	Has the generator site implemented administrative controls to ensure that prohibited items are documented and managed in accordance with site specific certification plans and that the following minimum site specific administrative controls: C Identify the organization(s) responsible for compliance with administrative controls. C Identify the oversight procedures and frequency of actions to verify compliance with administrative controls. C Develop on-the-job training specific to administrative control procedures. C Ensure that personnel may stop work if noncompliance with administrative controls is identified. C Develop a nonconformance process that complies with the requirements in Section B3-13 of the WAP to document and establish corrective actions. C Address controlled changes to WAP-related plans or procedures as part of the nonconformance and corrective action process C As part of the corrective action process, assess the potential time frame of the noncompliance, the potentially affected waste population(s), and the reassessment and recertification of those wastes. (Section B4-3b, Section B3-13)					
	CONFIRMATION OF ACCEPTABLE KNOWLEDGE					
152	Does the generator site have written procedures for the confirmation of all acceptable knowledge information using analytical data, including headspace gas data, sampling and analysis, and non destructive assay, non-destructive examination, and/or visual examination? Are these procedures developed for both retrievably stored and newly generated waste? (Section B4-3d)					

	WAP Requirement[2]	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	
153	Does the generator site have written procedures for newly generated waste to document the confirmation of acceptable knowledge information with either the visual examination technique prior to or during waste packaging or radiography (or VE in lieu of radiography) after waste packaging? Do these procedures address the required elements in 3.4-3d? (Section B4-3d)					
154	Are Procedures in place to ensure that acceptable knowledge is confirmed using visual examination when retrievably stored waste is repackaged? (Section B4-3d)					
155	Does the generator site have procedures for reevaluating acceptable knowledge if radiography or visual examination identify it to be a different waste matrix codes? Does this procedure describe how the waste is reassigned, acceptable knowledge reevaluation, and appropriate hazardous waste codes are reassigned? (Section B4-3d)					
156	Do site procedures indicate that debris waste are assigned toxicity characteristic EPA numbers based on AK? Is radiography or visual examination used to confirm the waste matrix code and waste stream identified using AK? (Section B4-4)					
157	Do the procedures document how discrepancies in the waste matrix code are recorded and changes to hazardous waste codes are recorded? (Section B4-3d)					

	WAP Requirement[2]	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	
	CRITERIA FOR ASSEMBLING AN ACCEPTABLE KNOWLEDGE RECORD DELINEATING THE WASTE STREAM					
158	If wastes are reassigned to a different waste matrix code based on visual examination or radiography, does the generator site have written documentation to ensure that the following steps are followed: C Review existing information based on the container identification number and document all differences in hazardous waste code assignments C If differences exist in the hazardous waste codes that were assigned, reassess and document all required acceptable knowledge information (Section B3-b) associated with the new designation C Reassess and document all sampling and analytical data associated with the waste C Verify and document that the reassigned waste matrix code was generated within the specified time period, area and buildings, waste generating process, and that the process material inputs are consistent with the waste material parameters identified during radiography or visual examination C Record all changes to acceptable knowledge records C If discrepancies exist in the acceptable knowledge information for the reassigned waste matrix code, document the segregation of this container, and define the corrective actions necessary to fully characterize the waste (Section B4-3d)					
159	Does the generator site documents state that both sampling and analysis (S3000 and S4000 waste stream) and headspace gas (for all waste streams) data be used to confirm acceptable knowledge hazardous waste designations? (Section B4-3d)					
160	Do site documents state that radiography (or VE, if waste is newly generated) is used to confirm waste matrix code and waste streams assigned to retrievably stored waste via AK? (Section B4-3d)					

	WAP Requirement[2]	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	
161	Do site procedures ensure that headspace gas and solid/soil analytical data are used to confirm or reevaluate AK assignments for hazardous waste? If a constituent is detected in headspace gas that the site believes isn't from the waste process, the site must provide documentation to support any determination that organic constituents are associated with packaging materials, radiolysis, or other uses not consistent with solvent use. If the source of the detected headspace gas solvents cannot be identified, the appropriate F listing will be assigned. If a constituent in a listed waste is present in solid/soil analytical results, the appropriate listed waste shall be added to the waste stream. F-listed waste assigned by acceptable knowledge shall not be removed based on confirmatory headspace gas or solids analysis. In the case of totals/TCLP analysis, do procedures reflect the allowance for concentration assessments, wherein sites may add or remove total/TCLP and non-toxic F003 constituents found in headspace and solid/soil analyses? (Section B4-3d)					
162	If the confirmatory process determines that a hazardous constituent as identified in headspace gas sampling or soil/homogeneous waste sampling is present in the waste, does the generator site indicate that they will: 1) assign the hazardous waste code to the entire waste stream as applicable, or 2) segregate drums containing detectable concentrations of solvent into a separate waste stream, and assign "new" hazardous waste codes? (Section B4-3d)					
163	Does the generator site document, justify, and consistently delineate waste streams and assign hazardous waste codes based on site specific permit requirements or state-enforced agreements? (Section B4-4)					
164	Does the generator site have written methodologies for determining the mean concentration of solvent VOCs detected by either headspace gas analysis or homogeneous waste sampling for each waste stream or waste stream lot, and are all data ("U" flags designated as one half the MDL and "J" flags, which are less than the PRQL but greater than the MDL)? (Section B4-3d)					
165	Do procedures ensure that spent solvent assignments are made by using the UCL_{90} (of mean concentration), and comparing this with the PRQLs? If the UCL_{90} exceeds the PRQL, is acceptable knowledge reevaluated and new waste stream designated, or is the current waste stream description modified to include the hazardous constituent? (Section B4-3d)					
166	Does the site indicate that it will document, justify, and consistently delineate waste streams and assign EPA hazardous waste numbers? (Section B4-3d)					

	WAP Requirement[2]	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	
167	Does the site have written procedures for situations where concentrations of some VOCs are orders of magnitude higher than other target analytes? In these cases, elevated MDLs may be generated, and those constituents with an elevated MDL but "U" designation will not be used in median calculations. (Section B4-3d)					
	DATA QUALITY REQUIREMENTS					
168	Are acceptable knowledge processes consistently applied among all generator sites, and does each generator site comply with the following data quality requirements for acceptable knowledge documentation: C Precision - Precision is the agreement among a set of replicate measurements without assumption of the knowledge of a true value. The qualitative determinations, such as compiling and assessing acceptable knowledge documentation, do not lend themselves to statistical evaluations of precision. Therefore, precision requirements are not established for acceptable knowledge. C Accuracy - Accuracy is the degree of agreement between an observed sample result and the true value. The percentage of waste containers which require reassignment to a new waste matrix code and/or designation of different hazardous waste codes based an the reevaluation of acceptable knowledge and sampling and analysis data will be reported as a measure of acceptable knowledge accuracy. C Completeness - Completeness is an assessment of the number of waste streams or number of samples collected to the number of samples determined to be useable through the data validation process. The acceptable knowledge record must contain 100 percent of the information specified in Section B4-2. The useability of the acceptable knowledge information will be assessed for completeness during audits.					

	WAP Requirement[2]	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	
	C Comparability - Data are considered comparable when one set of data can be compared to another set of data. Comparability is ensured through sites meeting the training requirements and complying with the minimum standards outlined for procedures that are used to implement the acceptable knowledge process. All sites must assign hazardous waste codes in accordance with Section B3-b and provide this information regarding its waste to other sites who store or generate a similar waste stream. C Representativeness - Representativeness expresses the degree to which sample data accurately and precisely represent characteristics of a population. Representativeness is a qualitative parameter that will be satisfied by ensuring that the process of obtaining, evaluating, and documenting acceptable knowledge information is performed in accordance with the minimum standards established in Section B3-b. Sites also must assess and document the limitations of the acceptable knowledge information used to assign hazardous waste codes (e.g., purpose and scope of information, date of publication, type and extent to which waste parameters are addressed and limitations of information in identifying hazardous wastes). (Section B4-3e)					
169	Does the generator site address quality control by tracking its performance with regard to the use of acceptable knowledge by: 1) assessing the frequency of inconsistencies among information, and 2) documenting the results of acceptable knowledge confirmation through radiography or visual examination, headspace-gas analyses, and homogeneous waste analyses. In addition, the acceptable knowledge process and waste stream documentation must be evaluated through internal assessments by quality assurance organizations and assessments by auditors or observers external to the organization (i.e., Permittees, NMED, EPA). (Section B4-3e)					
	AUDIT REQUIREMENTS					
170	What waste stream/waste summary category groups does this acceptable knowledge audit apply to? (Section B4-3f)					

	WAP Requirement[2]	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	
171	Evaluate acceptable knowledge documentation for at least one waste stream from each summary category group(s) being audited. The audit must include acceptable knowledge traceability for at least one container from each audited summary category group. (Section B4-3f)					
172	Review all procedures and associated processes developed by the site for documenting the process of compiling acceptable knowledge documentation; correlating information to specific waste inventories; assigning hazardous waste codes; and identifying, resolving, and documenting discrepancies in acceptable knowledge records. (Section B4-3f)					
173	Evaluate the adequacy of acceptable knowledge procedures and identify any deficiencies in procedures documented in the audit report. (Section B4-3f)					
174	Evaluate all required AK documentation for: C logic, C completeness, and C defensibility (Section B4-3f)					
175	Assess completeness, traceability of information, consistency of application of information, clarity of presentation, degree of compliance with Attachment B4 of the WAP, nonconformance procedures oversight procedures. (Section B4-3f)					
176	Evaluate the availability of required AK data. Review the records for correlations to specific waste streams and for basis of hazardous waste characterization. Are all required information included and hazardous waste designations appropriate? (Section B4-3f)					
177	Verify and document that site used management controls and follow written procedures to characterize hazardous waste for newly generated and retrievably stored wastes. Auditors will review procedures used by site to confirm acceptable knowledge. (Section B4-3f)					
	ADDITIONAL CONFIRMATION					

	WAP Requirement[2]	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	
178	Does the site include procedures/assurances that any waste container with unresolved discrepancies associated with hazardous waste characterization will not be managed, stored, or disposed at the WIPP until the discrepancies are resolved? (Section B4-4)					
179	Has a waste stream been revoked? Has NMED been notified? What are their required notification procedures for when a container is revoked to notify NMED? (Section B4-4)					
180	If data consistently indicate discrepancies with acceptable knowledge information, has the site reassessed the materials and processes that generate the waste, and resubmitted waste stream profile information and implemented their corrective action system? Until discrepancies are resolve, management, storage, or disposal of the waste stream at the WIPP is prohibited. (Section B4-4)					
181	Prior to shipment, does the site review waste stream profile forms, the WWIS, and associated Batch Data Reports to ensure that confirmatory analyses verify hazardous waste characterization from acceptable knowledge? (Section B4-4)					

1. NMED expects a traceability analysis to be performed, the results of which should be presented on this checklist under the "Examples of Implementation" column. Further, the traceability analysis process and results should be discussed in the Final Audit Report.

2. The WAP requirements should be presented in documents, such as procedures. Each of the questions posed under WAP requirements are meant to determine whether procedures are in place or whether documents are evident which demonstrate that the specific WAP requirement is or can be met.

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Table B6-4 Headspace Gas Checklist

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Headspace Gas 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	
	HEADSPACE GAS SAMPLING FREQUENCY					
182	Are procedures in place to ensure that every retrievably stored and newly generated waste containers or randomly selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in Section B-3a(1), except for waste containers belonging to LANL sealed sources waste streams as specified in Section B-3a(1)(iii), will undergo headspace gas sampling and analysis? (Section B-3a, -3b)					
182a	Are procedures in place or is a program described in the LANL QAPjP to assure that VOC concentrations are determined and assigned in accordance with Permit Attachment B, Section B-3a(1)(iii) for waste containers that belong to LANL sealed sources waste streams and meet the criteria specified in Section B-3a(1)(iii)? (Section B-3a(1)(iii))					
183	Are procedures in place to ensure that all waste containers or randomly selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in Section B-3a(1) (except for qualifying waste containers belonging to LANL sealed sources waste streams as specified in Section B-3a(1)(iii)) will be allowed to equilibrate to sampling room temperature for 72 hours prior to sampling (18º C or higher) and that the drum ages specified in accordance with Section B1-1a(1) and B1-1a(2) are met? All information necessary to determine drum age criteria must be determined, including but not limited to: • Scenario Determination • Packaging Configuration • Filter Diffusivity • Liner/Lid Opening Diameter Are procedures in place to ensure that equilibrium time and drum ages are documented for each container from which a headspace gas sample is collected as specified in Section B1-1a(3)? (Section B1-1a)					
	HEADSPACE GAS SAMPLING GENERAL REQUIREMENTS					

	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	
184	Are procedures in place to ensure all containers of waste are properly vented through individual composite filters or filters with equivalent VOC dispersion characteristics to ensure that gases are adequately vented and characteristic waste does not develop? (Section B-1c)					
185	Are procedures in place to ensure waste containers and contents are allowed to equilibrate to the temperature of the sampling area (18 ºC and higher or higher) by waiting a minimum of 72 hours prior to sampling? (Section B1-1a)					
185a						
186	Are procedures in place to ensure that the following gas sample container and holding time requirements are met: C The minimum sample volume for VOC. sample collection is 250 mL. (Note: a single 100 mL sample may be collected if the headspace is limited) C Holding temperatures shall be between 0º C and 40º C (Table B1-1)					
187	Are procedures in place to ensure that all sampling is performed in an appropriate radiation containment area? (Section B1-1a)					
188	Are procedures in place to ensure that headspace gas are analyzed for the analytes listed in Table B3-2 of the Attachment B3? (Section B1-1a)					
189	Are procedures in place to ensure that all headspace gas analyses utilize either SUMMA® or equivalent canisters or on-line integrated sampling/analysis systems? (Section B1-1a)					
	MANIFOLD SAMPLING					

	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	
190	Are procedures, processes, and equipment in place to ensure that the following sampling procedures are implemented: C The sampling equipment is leak checked and cleaned upon first use and as needed C The manifold and sample canisters are evacuated to 0.1 mm Hg prior to sample collection C Cleaned and evacuated sample canisters are attached to the evacuated manifold before the manifold inlet valve is opened C The manifold inlet valve is attached to a changeable filter connected to either a side port needle sampling head capable of forming an airtight seal (for penetrating a filter or rigid poly liner when necessary), a drum punch sampling head capable of forming an airtight seal (capable of punching through the metal lid of a drum while maintaining and airtight seal for sampling through the drum lid), or a sampling head with an airtight seal for sampling through a pipe overpack container filter vent hole. Refer to Section B1-1a(6) for descriptions of these sampling heads. C Field blanks are collected using samples of room air collected in the sampling area in the immediate vicinity of the waste container. *(Note: field blanks for SUMMA® canisters are collected directly into the canister)* C Manifold equipped with purge assembly that allows QC samples to be collected through all sampling components that affect compliance with QAOs C The manifold internal volume is calculated and documented in a field logbook C The volume of headspace gas collected as calculated by the canister volume and internal manifold volume is less than 10 percent of the available headspace volume when a volume estimate is available (Section B1-1a(1))					

	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	
191	Are procedures, processes, and equipment in place to ensure that the following manifold sample side conditions are met: C The sampling head forms a leak-tight connection with the sampling manifold C A flexible hose allowing movement from the purge assembly to the waste container C Pressure sensors that are pneumatically connected to the manifold and can measure absolute pressure from 0.05 mm Hg to 1000 mm Hg with a resolution of 0.01 mm Hg at 0.05 mm Hg. The pressure sensors shall have an operating range of 15º C to 40º C. C Sufficient canister ports shall be available to allow simultaneous collection of headspace gas samples and duplicates for VOC. analysis (if using SUMMA® canisters). C Ports not occupied with sample canisters require a plug or VCR® valve to prevent ambient air from entering the system C Ports shall have VCR® fittings for connection to the sample canisters C Sample canisters are leak-free, welded stainless steel pressure vessels, with a Cr-Ni oxide SUMMA®-passivated interior surface or canisters with equivalently inert surfaces, bellows valve, and a pressure/vacuum gauge. All canisters shall have VCR ® fittings to sampling and analytical equipment C The pressure/vacuum gauge mounted on each canister shall be helium-leak checked to 1.5 X 10^{-7} cc/s, have stainless steel construction, and be capable of operating at temperatures to 125º C					

	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	
191a	C A dry vacuum pump capable of reducing the manifold pressure to 0.05 mm Hg. (Note: If an oil vacuum pump is used precautions such as a molecular sieve or cryogenic trap shall be used to prevent diffusion of oil vapors back into the manifold) C A minimum distance between the needle and the valve that isolates the pump from the manifold C If real time blanks are not available, the manifold shall be equipped with an OVA capable of detecting all analytes listed in Table B3-2 and is capable of measuring total VOC concentrations below the lowest headspace gas VOC constituent PRQL (Section B1-1a(4))					

	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	
192	Are procedures, processes, and equipment in place to ensure that the following manifold standard side conditions are met: C A cylinder of compressed zero air, helium, or nitrogen that is hydrocarbon and CO_2 free air (only hydrocarbon and CO_2-free gases required for FTIRS) certified by the manufacturer to contain less than one ppm VOCs. The gas is used to clean the manifold between samples and to provide gas for the collection of equipment and on-line blanks *(Note: a zero air or nitrogen generator may be used, provided a sample of air is collected and found to contain less than 1 ppm total VOCs and the air is humidified)* C Cylinders of reference gas with known concentrations of analytes from Table B3-2 certified by the manufacturer to provide gases for evaluating the accuracy of the headspace gas sampling process C All cylinders of reference gases and zero air shall be connected to flow regulating devices that are corrosion proof and that do not allow for the introduction of manifold gas into the purge gas cylinders or generator C A humidifier filled with ASTM Type I or II water, connected, and opened to the standard side of the manifold between the compressed gas cylinders and the purge assembly, if the Fourier Transform Infrared System (FTIRS) is not used. No humidifier if the FTIRS is used *(Note: Compressed gas may include water vapor between 1000 and 10000 ppmv in lieu of a humidifier)* C The humidifier is off-line during system evacuation to prevent manifold flooding					
192a	C A purge assembly that allows the sampling head to be connected to the standard side of the manifold. C A flow indicating device or pressure regulator that is connected downstream of the purge assembly to monitor the flow rate or pressure of gases through the purge assembly to ensure that excess flow is available to prevent ambient air from contaminating the QC samples. (Section B1-1a(4))					

	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	
193	Do procedures ensure that NIST Certified (or equivalent) ambient pressure sensors maintained in the sampling area have a sufficient measurement range for the expected ambient barometric pressures and a resolution of 1 mm Hg or less? (Section B1-1a(4))					
194	Do procedures ensure that the NIST traceable (or equivalent) temperature sensor in the sampling location has a sufficient temperature range for the sampling location (-30 to 50°C) ? (Section B1-1a(4))					
	DIRECT CANISTER SAMPLING					

	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	
195	Are procedures, processes, and equipment in place to ensure that the following operating conditions are in place for direct canister sampling: C Canisters are evacuated to 0.1 mm Hg prior to use and attached to a changeable filter connected to the sampling head C Sampling heads are capable of either punching through the metal lid of the drums while maintaining an airtight seal for sampling through the drum lid, penetrating a filter or the septum in the orifice of a self-tapping screw, or maintaining an airtight seal for sampling through a pipe overpack container filter vent hole. C Field duplicates are collected in the same manner and at the same time as the original sample. C Field blanks shall be samples of room air collected in the immediate vicinity of the waste drum sampling area prior to removal of the drum lid. C Equipment blanks and field reference standards shall be collected using a purge assembly equivalent to the standard side of the manifold C Less than 10 percent of the headspace is withdrawn when a headspace estimate is available *(Note: The volume withdrawn is the canister volume and the internal volume of the sampling head)* C Each sample canister is equipped with a pressure/vacuum gauge capable of indicating leaks and sample collection volumes. The gauge shall be helium leak tested to 1.5 X 10^{-7} cc/s, have all stainless steel construction and be capable of tolerating temperatures to 125º C C Summa® canisters or equivalent are used to collect samples (Section B1-1a(5))					

	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	
	SAMPLING HEADS UNDER DRUM LIDS: SAMPLING THROUGH A CARBON FILTER					
196	Are procedures, process, and equipment adequate to ensure that samples collected through a filter meet the following requirements: C The lid of the drum's 90-mil poly liner shall contain a hole for venting to the drum C That non-vented drums are not sampled until an internal nonconformance report is prepared, submitted, and resolved in order to obtain a representative sample C The filter shall be sealed to prevent outside air from entering the drum C The sampling head for collecting drum headspace gas shall consist of a side-port needle, a filter to prevent particle contamination of the sample, and an adapter to connect the needle and filter C The sampling head is cleaned or replaced after each use C The housing of the filter shall allow insertion of the sampling needle through the filter element or a sampling port with septum that bypasses the filter element into the drum headspace C The side port needle shall be used to reduce the potential for plugging C The purge assembly shall be modified for compatibility with the side port needle. (Section B1-1a(6)(i))					
	SAMPLING HEADS UNDER DRUM LIDS: SAMPLING THROUGH THE DRUM LID					
197	Are procedures in place to establish the criteria for sampling through the drum lid as opposed to sampling through a filter? (Section B1-1a(3)(ii))					
197a	If sampling through a pipe overpack container filter vent hole with an airtight device is used, are procedures in place to ensure that a sampling head with an airtight seal for sampling through a pipe overpack container filter vent hole are available? (Section B1-1a(4); B1-1a(5); B1-1c(5))					

	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	
197b	If sampling through a pipe overpack container filter vent hole is used, are the following criteria met? C The seal between the pipe overpack container surface and sampling apparatus shall be designed to minimize intrusion of ambient air. C The filter shall be replaced as quickly as is practicable with the airtight sampling apparatus to ensure that a representative sample can be taken. C All components of the sampling system that come into contact with sample gases shall be cleaned according to requirements for direct canister sampling or manifold sampling, whichever is appropriate, prior to sample collection. C Equipment blanks and field reference standards shall be collected through all the components of the sampling system that contact the headspace-gas sample. C During sampling, openings in the pipe overpack container shall be sealed to prevent outside air from entering the container. C A flow-indicating device shall be connected to sampling system and operated according to the direct canister or manifold sampling requirements, as appropriate. (Section B1-1a(6)(iii))					
197c	If sampling through a pipe overpack container filter vent hole is used, are the following criteria met? C The site has documentation that demonstrates that they have determined through testing the appropriate length of time for exchanging the filter with the sampling device to assure representative samples are collected. C The time for completing the exchange is incorporated into appropriate headspace gas sampling procedures. (Section B1-1a(6)(iii))					

	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	
198	Are procedures, process, and equipment adequate to ensure that samples collected through the drum lid meet the following requirements: C The lid of the drum's 90-mil poly liner shall contain a hole for venting to the drum C Non-vented drums are not sampled until an internal nonconformance report is prepared, submitted, and resolved in order to obtain a representative sample C The drum lid shall be breached using a punch that forms an airtight seal between the drum lid and the manifold or canister C The seal between the drum lid and the sampling head shall be designed to minimize the intrusion of ambient air C All components of the drum punch sampling system that come in contact with sample gases shall be purged with humidified zero air, nitrogen, or helium prior to sample collection C Equipment blanks and field reference standards shall be collected through all components of the punch that contact the headspace gas sample C Pressure shall be applied to the punch until the drum lid has been breached C Provisions shall be made to relieve drum pressure increases during drum punch operations and during sealing of the drum punch to the drum lid C The filter is sealed to prevent ambient air from entering the drum (Section B1-1a(6)(i) and (ii))					

	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	
198a	C A flow indicating device to verify excess flow of QC gases for system purge shall be pneumatically connected to the drum punch and operated in the same manner as the flow indicating device used in the manifold system C Equipment are used to secure the drum punch sampling system to the drum lid C If the headspace gas sample is not taken at the time of drum punching, the presence and diameter of the rigid liner vent hole is documented during the punching operation for use in determining an appropriate Scenario 2 DAC. (Section B1-1a(6)(ii))					

	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	
	QUALITY CONTROL SAMPLE COLLECTION					
199	Are procedures in place to ensure that the following QC sample requirements are met: C Field QC samples are collected on per sample batch basis for manifold and direct canister sampling. A sampling batch is defined as up to 20 samples collected within 14 days of the first sample C Field samples are collected on a per on-line batch basis for on-line sampling/analysis systems. An on-line batch is defined as the number of samples that are collected in a 12 hour period from the same on-line integrated sample/analysis system C For the manifold sampling method, field blanks, equipment blanks, field duplicates, and field reference samples are collected prior to sample collection on a per sampling batch basis or one per day, whichever is more frequent C For the direct canister sampling method field blanks and field duplicates are collected on a per sampling batch basis prior to sample collection; while equipment blanks and field reference samples are collected after equipment purchase, cleaning, and assembly					
199a	C For the On-line sampling method, field blanks, equipment blanks, field duplicates, and field reference samples are collected on a per on-line batch basis. *(Note: The on-line blank replaces the laboratory and equipment blanks, the on-line duplicate replaces the laboratory duplicate, and the on-line reference standard replaces the laboratory control sample.)* (Section B1-1b, B1-1b(1), B1-1b(2))					

	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	
200	Do procedures adequately assign the Site Project QA Officer with the responsibility of monitoring field QC results and initiate the nonconformance report process in the event the following acceptance criteria are not met or sample collection frequencies are not met: C Field and equipment blanks shall be less than 3 times the detection limits specified in Table B3-2 and equipment blank results determined by FTIR shall be less than the PRQL specified in Table B3-2 (Section B1-1b(1) and B1-1b(2)) C Field reference standards shall have a recovery of between 70 and 130% (Table B1-3) C Field Duplicates shall have an RPD of less than 25 (Table B1-3)					
201	Are procedures in place to ensure that field reference standards meet the following criteria: C Field reference standards shall contain a minimum of 6 analytes listed in Table B3-2 at a range of between 10 and 100 ppmv and at concentrations greater than the MDL C Field reference standards shall be traceable to a nationally recognized standard, if available C If commercial gases are used, they shall be accompanied by a Certificate of Analysis and all field reference standards are traceable to certificates. C Commercial gases are not used past the manufacturer specified shelf life. C Field reference samples are submitted blind to the laboratory at a frequency of one per sampling batch. (Note: Field reference standards may be discontinued for direct canister method if QAO accuracy objectives are met) (Section B1-1b(3))					
202	Are procedures in place to ensure that field duplicate samples are collected sequentially to the sample. (Section B1-1b(4))					

	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	
	SAMPLE EQUIPMENT TESTING, INSPECTION AND MAINTENANCE					
203	Are procedures in place to ensure that sample containers are cleaned in accordance with the following specifications: C All sampling components that contact sample gases are constructed of inert materials such as Teflon® C The sampling manifold and canisters are properly cleaned and leak checked prior to each sampling event in accordance to or equivalent with TO-14 methodology C SUMMA® canisters or equivalent are cleaned on an equipment cleaning batch basis. An equipment batch is defined as the number of canisters that can be cleaned together at one time using the same cleaning method C The cleaning system consists of an optional oven and a vacuum manifold which uses a dry vacuum pump or a cryogenic trap backed by an oil sealed pump C Prior to cleaning a 24 hour leak check shall be performed (+/- 2 psig) on all canisters C Canisters that fail the leak check are segregated, checked for leaks, repaired, and reprocessed C One canister per equipment cleaning batch is filled with humid zero air and analyzed for VOCs C A batch is considered clean if VOC concentrations are less than 3 times the MDLs specified in Table B3-2 C Certified leak-free canisters are evacuated to 0.1 mm Hg prior to storage C Canister cleaning certification documentation is available at the cleaning facility and the cleaning facility initiates canister tags. (Section B1-1c(1))					

	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	
204	Are procedures in place to ensure that manifold pressure sensors, canister pressure gauges, and ambient air temperature sensors are certified prior to initial use and annually using NIST traceable standards. In addition OVA's if used shall be calibrated daily using known calibration gases and the balance of the OVA calibration is consistent with the manifold purge gas. (Section B1-1d)					

	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	
205	Are procedures in place to ensure that sampling equipment are cleaned and leak checked using the following specifications: C Surfaces of all sampling equipment that will come in contact with sample gases are thoroughly inspected and cleaned prior to assembly C Manifolds and sampling heads shall be purged with humidified zero air or equivalent and leak checked after assembly C The cleaning and leak check process shall be repeated if routine system cleaning is inadequate C Manifolds and sampling heads which are reused shall be cleaned and leak checked according to procedures in the methods manual after sample collection, field duplicate collection, field blank collection, and after the additional cleaning require for field reference samples. All manifold ports shall be capped or closed with valves (sample canisters may be attached as well) C Manifolds are cleaned by heating the sample side of the manifold to 150 °C and flushing with zero air or equivalent at a rate of 1 liter/min for 3 minutes C Manifolds not in use are demonstrated as clean before storage with a positive pressure of zero air gas in the sampling and standard sides C Sampling is suspended if VOC levels greater than 3 times the levels in Table B3-2 are found in the equipment blank analysis C Sampling systems are cleaned after reference standard collection by installing a gas tight connector in place of the sampling head, between the flexible hose and purge assembly. This allows the sample and standard side to be flushed with humidified zero air in conjunction with heated pneumatic lines C Needles, adapters, and filters are cleaned in accordance with the EPA Method TO-14 procedures. Sample heads shall be discarded or cleaned according to Method TO-14. In addition, the needle and filter are also purged with zero air and capped for storage (Section B1-1c(2) , Section B1-1c(3), Section B1-1c(4), and Section B1-c(5))					
	SAMPLE HANDLING AND CUSTODY					

	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	
206	Are procedures in place to ensure that field log, sample labels, and Chain of Custody Records are completed in a manner that meets accepted standards for legal defensibility and admissibility (Section B1-4)					
207	Do formats for field logs and custody records specify documentation of the following information: C Name of sampling facility C Waste container identification number C Sample identification number of each sample referenced to waste container C Sample matrix C Time and date of sample collection C Type/number and size of sample container(s) C Method of sample preservation C Requested analyses C Sampler(s) name through signature					
	C Signatures of custodians relinquishing and receiving custody of samples including date and time of transfer until time of final disposition C Analytical laboratory C Off-site shipping information (date, time, shipper, mode, air bill or lading number) (Section B1-4)					
208	Are procedures are in place to ensure that waste containers are sequentially and uniquely numbered by site and within the site? (Section B1-4)					

	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	
209	Do sample tags or labels contain the following information: C Sample Description to adequately describe sample location and appearance C Ambient temperature and pressure C Sample identification number C Analyses requested C Date/Time sampled C QC Designation C Sampler's initials and organization (Section B1-4)					
210	All sampling equipment, canisters, and samples are identified with unique identification numbers that are traceable to equipment cleaning batches. (Section B1-4)					

	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	
211	Are procedures in place to ensure waste containers and samples are sealed with intact custody seals and that one or more of the following custody conditions are met: C It is in the possession of an authorized individual C It is in the view of an authorized individual, after being in the possession of that individual C It was in the possession of an authorized individual and access to the sample was controlled by locking or placement of signed custody seals that prevent undetected access C It is in a designated secure area, such as a controlled access location with complete documentation of personnel access or a radiological containment area (hot cell or glove box) (Section B1-4)					
212	Are procedures in place to ensure that discrepant sample information, indications of damage, or indications of tampering are documented? (Section B1-4)					
213	Are procedures in place to ensure that custody information will be maintained in accordance with EPA NEIC guidance (Section B3-10)					
214	Are procedures in place to ensure that sample custody is maintained until the following conditions are met: C Sample analyses are completed and data has been validated at the project level, and C The sample is released by the site project manager or expended (Section B1-4)					
215	Are procedures in place to ensure that SUMMA canisters are packaged to prevent damage to the pressure gauge or associated connections by packaging in metal boxes with separate compartments or cardboard boxes with foam inserts? (Section B1-5)					

	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	
216	Are procedures in place to ensure that samples are packaged to prevent damage to the sample container and maintain preservation temperature?. (Section B1-5)					
217	Are procedures in place to ensure that adequate cold packs are included in the DOT approved sample shipping container to ensure that all temperature requirements are met? (Section B1-5)					
218	Are procedures in place to ensure that sample COC forms are secured for shipment to the inside of the sealed or locked shipping container lid and that samples and shipping containers are affixed with tamper proof seals or devices? (Section B1-5)					
219	Are procedures in place to ensure that a blank consisting of organic free water is included with each shipment container containing VOC samples? (Section B1-5)					

	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	
	LABORATORY OPERATIONS					
220	Are procedures in place to ensure that all VOC analyses are evaluated using the following criteria: C Precision is assessed through evaluation of laboratory duplicates, Laboratory Control Sample (LCS) replicates, and PDP blind audit samples in comparison to Table B3-3 C Accuracy is assessed through evaluation of LCS samples and blind PDP audit samples in comparison to criteria in Table B3-3 C MDL's are expressed in nanogram/liter C Laboratory completeness shall be expressed as the number of samples analyzed with valid results as a percent of the total number of samples collected. A composited sample is treated as one sample for the purposes of completeness, because only one sample is run through the analytical instrument C Comparability shall be achieved through the use of standardized methods, through the consistent application of data useability criteria, and traceable standards and through successful participation in the PDP program C Representativeness will be achieved through the use of standardized sample collection methods with a demonstrated absence of blank contamination C All method detection limits and program required detection limits shall be less than the Program Required Detection Limits listed in Table B3-2 and the detection limit study procedures shall be documented in laboratory SOPs. In addition, the laboratory shall demonstrate that they are capable of meeting the Program Required Detection Limits by analyzing at least one calibration standard below the PRQL (Section B3-5)					
221	Are procedures in place to ensure that only laboratories that are qualified through participation in the Performance Demonstration Program are eligible to analyze waste samples? (Section B-3a(3))					

	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	
222	Are procedures in place to ensure that Tentatively Identified Compounds shall be added to the target compound list if they are reported in 25% of the waste containers sampled in accordance with SW-846 criteria for a given waste stream (with the exception of non-toxic F003 constituents) and if they appear in the 20 NMAC 4.1.200 (incorporating 40 CFR §261) Appendix VIII list? (Section B-3a(1))					
222a	Are procedures documented to ensure that the following criteria are met with regard to the recognition and reporting of TICS for GC/MS Methods for headspace gas sampling: C Relative intensities of major ions in the reference spectrum (ions greater than 10% of the most abundant ion) should be present in the sample spectrum. C The relative intensities of the major ions should agree within ± 20 percent. C Molecular ions present in the reference spectrum should be present in the sample spectrum. C Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds. C Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks. C The reference spectra used for identifying TICs shall include, at minimum, all of the available spectra for compounds that appear in the 20.4.1.200 NMAC (incorporating 40 CFR Part 261) Appendix VIII list. The reference spectra may be limited to VOCs when analyzing headspace gas samples. C TICs for headspace gas analyses that are performed through FTIR analyses shall be identified in accordance with the specifications of SW-846 Method 8410. (Section B3-1)					

	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	
222b	Are procedures in place to assure that TICs are reported as part of the analytical batch data reports for GC/MS Methods in accordance with the following minimum criteria: C a TIC in an individual container headspace gas or solids sample shall be reported in the analytical batch data report if the TIC meets the SW-846 identification criteria listed above and is present with a minimum of 10% of the area of the nearest internal standard. C a TIC in a composited headspace gas sample that contains 2 to 5 individual container samples shall be reported in the analytical batch data report if the TIC meets the SW-846 identification criteria listed above and is present with a minimum of 2% of the area of the nearest internal standard. C a TIC in a composited headspace gas sample that contains 6 to 10 individual container samples shall be reported in the analytical batch data report if the TIC meets the SW-846 identification criteria listed above and is present with a minimum of 1% of the area of the nearest internal standard. C a TIC in a composited headspace gas sample that contains 11 to 20 individual container samples shall be reported in the analytical batch data report if the TIC meets the SW-846 identification criteria listed above and is present with a minimum of 0.5% of the area of the nearest internal standard. (Section B3-1)					

	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	
	QUALITY ASSURANCE OBJECTIVES					
223	Are procedures in place to ensure that headspace gas sampling will occur from the drum headspace for all drums or randomly selected containers from waste streams that meet the conditions for reduced headspace gas sampling listed in Section B-3a(1) (except for qualifying waste containers belonging to LANL sealed sources waste streams as specified in Section B-3a(1)(iii))? (Section B3-2)					
224	Are procedures in place to ensure that the precision of the headspace gas analysis is assessed by the sequential collection of field duplicates for manifold sampling operations or simultaneous collection of field duplicates for direct canister sampling operations for VOCs? (Section B3-2)					
225	Are procedures in place to ensure that corrective action will be taken if the duplicate RPD for field duplicates exceeds 25 for any analyte found greater than the PRQL in both of the duplicate samples? (Section B3-2)					
226	Are procedures in place to ensure that the accuracy of headspace gas analysis is assessed through the collection of field reference standards and field blanks at a frequency of one for every 20 drums sampled or per sampling batch and through the collection of equipment blanks at the frequency of one for every equipment cleaning batch ? (Section B3-2)					
227	Are procedures in place to ensure that corrective actions are taken if the field reference standard is less than 70% recovery or greater than 130% recovery; and that if the blank concentration for any blank exceeds 3 times the MDL (PRDLs for metals) listings in Table B3-2? (Section B3-2)					
228	Are procedures in place to ensure that sampling completeness shall be expressed as the number of valid samples collected as a percent of the total number of samples collected for each waste steam, where a valid sample is defined as a sample collected in accordance with approved sampling methods and the drum was properly prepared for sampling? (Section B3-2)					
229	Are procedures in place to ensure that the minimum sampling completeness percentage for any waste stream is 90 percent? (Section B3-2)					

	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	
230	Are procedures in place to ensure that sample comparability is assured through the use and application of uniform procedures and equipment and application of data useability criteria, and that corrective action is taken if the uniform procedures and equipment are not used without approved and justified deviations (Section B3-2)					
231	Are procedures in place to ensure that sample representativeness is maintained (Section B3-2)					
232	Are procedures in place to ensure that analytical completeness rate of 90 percent is achieved for all VOC compounds in a waste stream (Table B3-2)					

1. The WAP requirements should be presented in documents, such as procedures. Each of the questions posed under WAP requirements are meant to determine whether procedures are in place or whether documents are evident which demonstrate that the specific WAP requirement is or can be met.

Table B6-5 Radiography Checklist

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Radiography 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	
	QUALITY ASSURANCE OBJECTIVES					
233	Are process procedures in place to meet the following Quality Assurance Objectives?: <u>Precision</u> C Did the site project QA Officer calculate and report the relative percent difference (RPD) between the estimated waste material parameter (WMP) weights as determined by radiography, and these same parameters as determined by visual examination (VE)? Is the precision of radiography enough to demonstrate compliance with QAOs through identifying an image test pattern? <u>Accuracy</u> C Was the accuracy with which the waste matrix code and WMP weights can be determined documented through VE of a randomly selected statistical portion of waste containers? C Was the percentage of waste containers which requires a new waste matrix code or were found to contain prohibited items after VE calculated and reported by the site project QA officer as a measure of radiography accuracy?					

	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	
233a	Completeness C Was an audio/videotape (or equivalent media) of the radiography examination and a radiography data form validated according to the requirements in Section B3.10? C Was an audio/videotape (or equivalent media) of the radiography examination and a radiography data form obtained for 100% of the retrievably stored waste containers? Comparability C Is comparability ensured through the use of standardized radiography procedures and operator training and qualifications (Section B3-4)					
	CHARACTERIZATION AND SYSTEM REQUIREMENTS					
234	Does the site have procedures to ensure that radiography is used to determine the waste material parameter contents and estimate waste material parameter weights of retrievably stored waste? (Section B3-4) Does the site have procedures to identify prohibited materials, and to identify/confirm waste matrix code (physical form)? (Section B-3c)					
235	Do procedures or other supporting documentation ensure that every waste container will undergo radiography and/or VE? (Section B-3c)					
236	Do procedures ensure that containers with lead liners are examined by visual examination rather than by radiography? (Section B1-3a)					
237	Do procedures or other supporting documentation ensure that radiography results are compared with waste stream descriptions as per B-3c? If discrepancies are noted, will a new waste stream be identified? (Section B-3c)					
238	Are there procedures to ensure the data obtained from an audio/videotaped scan provided by trained radiography operators? (Section B1-3b)					

	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	
239	Were all activities required to achieve the radiography objective described in site Quality Assurance Project Plans (QAPjPs) and Standard Operating Procedures (SOPs)? (Section B3-4)					
240	Did the radiography system consist of the following equipment or equivalent: C an X-ray producing device? C an imaging system? C an enclosure for radiation protection? C a waste container handling system (including a turntable dolly assembly)? C an audio/video recording system or equivalent? C an operator control and data acquisition station? (Section B1-3a)					
241	Did the X-ray producing device have controls which allow the operator to vary voltage, thereby controlling image quality? Was it possible to vary the voltage, typically between 150-400 kV, to provide an optimum degree of penetration through the waste? Was high-density material examined with the X-ray device set on the maximum voltage? Was low-density material examined at lower voltage settings to improve contrast and image definition? (Section B1-3a)					
242	Do procedures or other documentation ensure that the audio/videotape or equivalent made of the waste container scan and maintained as a non-permanent record? (Section B1-3a)					
	DATA COMPILATION					
243	Are there procedures to ensure that a radiography data form is used to document the waste matrix code, and estimated WMP weights of the waste? (Section B1-3a)					
244	Do procedures/processes ensure that the estimated WMP weights are determined by compiling an inventory of waste items, residual materials and packaging materials? Were the items on the inventory sorted by WMP and combined with a standard weight look-up table to provide an estimate of WMP weights? (Section B1-3a)					
245	If radiography indicate that the waste does not match the waste stream description, do procedures ensure that the appropriate corrective action was taken? (Section B3-13)					

	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	
246	If a discrepancy is noted, do procedures ensure that the proper waste stream assignment is determined, the correct hazardous waste codes assigned, and the resolution documented? (Section B3-13)					
	TRAINING					
247	Do site procedures ensure that only trained personnel allowed to operate radiography equipment? (Section B1-3b)					
248	Do site procedures ensure that training requirements for radiography operators comply with the training requirements of the WAP? (Section B1-3b)					
249	Does the documented training program provide radiography operators with both formal and on-the-job training (OJT)? (Section B1-3b)					
250	Does the documented training program ensure that the radiography operators are instructed in the specific waste generating practices and typical packaging configurations expected to be found in each waste stream at the site? (Section B1-3b)					
251	Does the documented training program ensure that the OJT and apprenticeship are conducted by an experienced, qualified radiography operator prior to qualification of the candidate? (Section B1-3b)					

	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	
252	Does the documented training program contain the following: Formal Training C Project Requirements C State and Federal Regulations C Basic Principles of Radiography C Radiographic Image Quality C Radiographic Scanning Techniques C Application Techniques C Radiography of Waste Forms C Standards, Codes, and Procedures for Radiography C Site-Specific Instruction On-the-Job Training C System Operation C Identification of Packaging Configurations C Identification of WMPs C Weight and Volume Estimation C Identification of Prohibited Items (Section B1-3b)					
253	Does the documented training program ensure that the radiography test drum include items common to the specific waste streams for which a Waste Stream Profile Form is sought? (Section B1-3b)					
253a						
254	Does the documented training program ensure that the test drums are divided into layers with varying packing densities or were different drums used to represent different situations that may occur during radiography examination at the site? (Section B1-3b)					
255	Does the documented training program ensure that test drums available that are representative of the waste matrix codes at the site and are representative test drums successfully examined prior to waste stream shipment? (Section B1-3b)					

	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	
256	Does the documented training program ensure that the radiography test drums include the following required elements: C Aerosol can with puncture? C Horsetail bag? C Pair of coveralls? C Empty bottle? C Irregular shaped pieces of wood? C Empty one gallon paint can? C Full container? C Aerosol can with fluid? C One gallon bottle with three tablespoons of fluid? C One gallon bottle with one cup of fluid (upside down)? C Leaded glove or leaded apron? C Wrench? (Section B1-3b)					
257	Does the documented training program ensure that the required elements of the test drum successfully identified by the operator as part of the qualification process and results documented? (Section B1-3b)					
258	Does the documented training program ensure that the qualification of the radiography operators, at a minimum, encompass the following requirements: C Successfully pass a comprehensive exam based upon training enabling objectives? C Perform practical capability demonstration in the presence of appointed site radiography subject matter expert (SME)? A radiography SME is an experienced radiography operator who is qualified as an OJT trainer? (Section B1-3b)					
259	Does the documented training program ensure that requalification of operators performed every two years at a minimum? (Section B1-3b)					
260	Does the documented training program ensure that requalification of operators is based upon evidence of continued satisfactory performance (primary audio/videotape or equivalent media reviews)? (Section B1-3b)					

	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	
261	Does the documented training program ensure that if performance is determined to be unsatisfactory (the misidentification of a prohibited item or a score of <80% on the comprehensive exam) unsatisfactory performance result in disqualification? Did the operator go through retraining and was satisfactory performance demonstrated before an operator was again allowed to operate the radiography system? (Section B1-3b)					
262	Does the documented training program ensure that a training drum with various container sizes is scanned by each operator on a biannual basis? Is the videotape reviewed by a supervisor to ensure that operators' interpretations remain consistent and accurate? (Section B1-3b)					
263	Do site procedures ensure that the site prepares separate testing report sheets for each waste container in the testing? (Section B3-10)					
264	For waste containers undergoing visual examination, does the testing report sheet for each waste container also identify the waste matrix code waste material parameter weights as determined by visual examination and prohibited materials? (Section B3-10)					
	QUALITY ASSURANCE					
265	Does the documented training program ensure that the imaging system characteristics are verified on a routine basis? (Section B1-3b(2))					
266	Do procedures ensure that independent replicate scans and replicate observations of the video output of the radiography process are performed under uniform conditions and procedures? Are independent replicate scans performed on one waste container per day per testing batch of 20 samples , which ever is less frequent? Are independent observations of one scan (not the replicate scan) performed once per day per testing , which ever is less frequent, by a qualified radiography operator (other than the individual who performed the first examination)? (Section B1-3b(2))					
267	Do procedures ensure that oversight functions, including periodic audio/videotape (or equivalent media) reviews of accepted waste containers, are performed by qualified radiography personnel (other than the operator who dispositioned the waste container)? (Section B1-3b(2))					

	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	
268	Is the site project QA officer responsible for monitoring the quality of the radiography data and calling for corrective action, when necessary? (Section B1-3b(2))					
269	Do procedures ensure that as an additional QC check, the radiography results are verified directly by visual examination of the waste container contents of a statistically determined portion of waste containers? (Section B1-3b(3))					
270	Do procedures ensure that the waste matrix code, waste material parameter weights verified through a comparison of radiography and visual examination results? (Section B1-3b(3))					
271	Do procedures ensure that the radiography operator have access to the visual examination results? (Section B1-3b(3))					
	EQUIPMENT TESTING AND MAINTENANCE					
272	Were all equipment tested and maintained in accordance with manufacturer instructions? (Section B3-4)					
273	Did the site QAPjP and SOPs document the specific manufacturer's requirements for testing and inspection? (Section B3-4)					
274	Is the radiography equipment calibrated and maintained in accordance with controls established and implemented in the site's QAPjP and SOPs, respectively? Do these procedures address performance criteria? (Section B3-4)					
275	When the radiography equipment is in use, are operational checks conducted at the beginning of each work shift? Do these checks include observation of a test pattern to ensure that the radiography system has adequate video quality? (Section B3-4)					
	DATA VALIDATION, REVIEW, VERIFICATION AND REPORTING					
276	Do procedures ensure that the generator data, all applicable requirements for data collection and management specified in B3-10, is achieved? With the exception of identifying items or conditions that could pose a hazard, the radiography results are not made available to visual examination personnel until after the visual examination is completed. (Section B3-10)					

	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	
277	Do procedures ensure that all applicable data generation review verification and validation activities specified in B3-10 are followed, including all signatory releases? (Section B3-10)					
278	Do procedures ensure that radiography tapes have been reviewed, at a minimum for every tenth waste container, against the data reported on the radiography form to ensure data are correct and completed? (Section B3-10)					
279	Do procedures ensure that all applicable project-level signatory releases and DQO's (Section B3-11) as specified in the WAP are performed (i.e. 100% radiographic or VE examinations, and project-level review of videotape, for one waste container/testing batch, at a minimum). (Section B3-11)					
280	Do procedures ensure that radiographic data for each container is transferred to the WIPP? (Section B-1c)					
281	Do procedures ensure that the site submit testing data reports for each waste container? Do these forms go to the site project office? Do they use approved standard forms? (Section B3-12)					
282	At the data generation level, do procedures ensure that all electronic and video data stored appropriately to ensure that waste container, sample, and associated QA data are readily retrievable? Are radiography tapes reviewed, at a minimum of every tenth waste container against the data reported on the radiography form? (Section B3-10)					
283	At the project level, do procedures require the site QA officer to certify that the radiography data are complete and acceptable based on the videotape review of at least one waste container per testing batch or daily, whichever is less frequent? (Section B3-10)					

1. The WAP requirements should be presented in documents, such as procedures. Each of the questions posed under WAP requirements are meant to determine whether procedures are in place or whether documents are evident which demonstrate that the specific WAP requirement is or can be met.

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Table B6-6 Visual Examination (VE) Checklist

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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	
	CONFIRMATION OF RADIOGRAPHIC RESULTS					
284	As a QC check on radiography, do procedures or other documentation require that the site open and visually examine a statistical portion of the retrievably stored waste containers? (Section B1-3b(3))					
285	Do site procedures ensure that the site use the data from visual examination to check the Waste Matrix Code, absence of prohibited items, and waste material parameter weight estimates, as determined by radiography? (Section B1-3b(3))					
286	Do site procedures ensure that the site use the data obtained from the visual examination to determine the percentage of miscertified waste containers for each Summary Category Group as required in Section B2-1? (Section B1-3b(3))					
287	Do site procedures require that the site initially use a miscertification rate of 11% to calculate the number of waste containers that must be visually examined until a site-specific miscertification rate has been established? (Section B2-1)					
288	Do site procedures require the site specific miscertification rate be applied initially to each Summary Category Group? Is a Summary Category Group-specific miscertification rate determined after 6 months or 50% of the Summary Category Group has undergone radiographic characterization? Is the entire Summary Category Group subject to the re-evaluated Summary Category Group miscertification rate? (Section B2-1)					
289	Do site procedures require that the site-specific miscertification rate be reassessed annually by calculating a drum-weighted average of all historic Summary Category Group-specific miscertification rates? Do procedures ensure that sites use a miscertification rate of 1% for any site-specific or Summary Category Group-specific miscertification rate calculated to be less than 1%? (Section B2-1)					
290	Table B2-1 presents the number of waste containers requiring visual examination by miscertification rate and annual number of waste containers per Summary Category Group undergoing characterization. Do procedures ensure that the annual number of waste containers per Summary Category Group undergoing characterization are within the range used in the table (50 to 2000)? (Section B2-1)					

	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	
291	Do procedures ensure that waste containers are randomly selected and examined based on established visual examination procedures? Were only waste containers certified for compliance with WIPP-WAC and TRAMPAC selected? (Section B2-1)					
292	Do procedures ensure that once containers have been visually examined, the UCL_{90} for the proportion miscertified is calculated? (Section B2-1)					
293	Do procedures ensure that the site takes precautions to ensure that corrective actions taken after the containers were visually examined to improve certification accuracy were not used to adjust the visual examination results and the UCL_{90}? (Section B3-13)					
294	Do procedures ensure that the facility use the hypergeometric distribution for the UCL_{90} calculation? The normal distribution is not allowed. If the binomial distribution was used, was *N* larger than 500 waste containers? (Section B2-1)					
295	Do procedures ensure that the results of the visual examination are forwarded to the radiography facility? (Section B1-3b(3))					
	TRAINING					
296	Is there documentation which shows that a standardized training program for visual examination personnel has been developed? Does it include both formal classroom and OJT? Is it specific to the site and include the various waste configurations generated/stored at the site? (Section B1-3b(3))					
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 B1-3b(3))					
298	Is there documentation which shows that the OJT and apprenticeship conducted by a qualified, experienced operator? Are the visual inspectors requalified once every two years?(Section B1-3b(3))					

	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	
299	Is the site specific training program based on the following elements: Formal Training - Project Requirements - State and Federal Regulations - Application Techniques - Site-Specific Instruction On-the-Job Training - Identification of Packaging Configurations - Identification of Waste Material Parameters - Weight and Volume Estimation - Identification of Prohibited Items (Section B1-3b(4),(5))					
	VISUAL EXAMINATION EXPERT REQUIREMENTS					
300	Does documentation ensure that the site has designated a visual examination expert? Has the visual examination expert completed all of the required training? 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 B1-3b(5))					
301	Does documentation ensure that the visual examination expert responsible for the overall management 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? (Section B1-3b(5))					
302	Do site documents indicate that the visual examination expert decided the extent of waste segregation within a container are necessary to achieve program objectives? (Section B1-3b(5)) Is the decision correct?					
303	Does the site's QAPjP specify decision-making criteria for the visual examination expert to follow when determining the appropriate degrees of segregation? Does the site have SOPs to support the visual examination process? How does the visual examination expert document the basis for his/her decision? (Section B1-3b(5))					

	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	
	VISUAL EXAMINATION PROCEDURES					
304	Do procedures indicate that visual examination is based on a semi-quantitative and/or qualitative evaluation of the waste container contents and that the examination recorded on audio/videotape or equivalent? (Section B1-3b(3))					
305	Do site procedures ensure that the visual inspector records the description of the waste container contents on a data form? Does the description clearly identify the appropriate waste matrix codes listed in the BIR? Is the information sufficient to estimate weights of waste material parameters? (Section B1-3b(3))					
306	Do site procedures ensure that when the bags are not opened, a brief written description of the contents of the bags is prepared to document the estimated amounts of each waste type in the bags, based upon the use of historically derived waste weight tables and an estimation of the waste volumes? (Section B1-3b(3))					
307	Do site procedures ensure that the written records of visual examination are supplemented with the audio/video recording or equivalent? (Section B1-3b(5))					
308	Does the site have a site-specific SOP for conducting visual examinations? (Section B1-3b(5))					
309	Do site documents include criteria for the visual examination expert to have in his/her decision-making criteria for assessing the need to open the bags/packages in order to identify all of their contents? (Section B1-3b(3),(5))					
310	Do site procedures ensure that if follows all the waste container handling and chain-of-custody procedures described in Section B1-4? (Section B1-4)					
311	In cases when visual examination is done as a QC check to the radiography results, are precautions taken to ensure that the visual examination team does not review the radiography results prior to the visual examination, with the exception of items or conditions that could pose a hazard to visual examination personnel? (Section B1-3b(3))					
312	Are there SOPs for ensuring that headspace gas sampling is conducted prior to the visual examination team's opening of the waste container? (Section B1-3b(3))					

	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	
313	Do site procedures ensure that when liquids are found, a description of their location, container, and estimated volume are recorded, and segregated? Are procedures in place to identify and segregate other prohibited items? (Section B-3c)					

1. The WAP requirements should be presented in documents, such as procedures. Each of the questions posed under WAP requirements are meant to determine whether procedures are in place or whether documents are evident which demonstrate that the specific WAP requirement is or can be met.

ATTACHMENT B7

PERMITTEE LEVEL TRU WASTE ~~APPROVAL AND ACCEPTANCE~~ CONFIRMATION PROCESSES

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ATTACHMENT B7

PERMITTEE LEVEL TRU WASTE ~~APPROVAL AND ACCEPTANCE~~ CONFIRMATION PROCESSES

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ATTACHMENT B7

PERMITTEE LEVEL TRU WASTE ~~APPROVAL AND ACCEPTANCE~~ CONFIRMATION PROCESSES

Introduction

This part of the Waste Analysis Plan (**WAP**) describes the actions that the Permittees will take to approve and accept waste for storage and disposal at the Waste Isolation Pilot Plant (**WIPP**), including waste ~~stream profile form (**WSPF**) approval and waste examination~~ confirmation activities.

The Permittees demonstrate compliance with the ~~Hazardous Waste Facility~~ Permit ~~(**HWFP**)~~ by ~~assuring~~ ensuring that the waste ~~analysis~~ characterization processes performed by generator/storage sites **(sites)** produce data compliant with the WAP and through the waste screening and verification processes. Verification occurs at three levels: 1) the data generation level, 2) the project level, and 3) the Permittee level. The Permittees also examine a representative subpopulation of waste prior to disposal to ~~assure~~ confirm that the waste contains no ignitable, corrosive or reactive waste; and that assigned Environmental Protection Agency (**EPA**) hazardous waste numbers are allowed by the ~~HWFP~~ Permit. The waste ~~examination~~ confirmation activities described herein ~~may~~ occur at the ~~WIPP facility or off-site (e.g.,~~ generator/storage site~~)~~.

B7-1 Permittee Confirmation ~~Level Waste Screening and Verification~~ of TRU Mixed Waste

Waste confirmation is defined in Module I as the activities performed by the Permittees to satisfy the requirements specified in Section 311 of Pub. L. 108-137. Waste confirmation occurs after waste containers have been certified for disposal at WIPP. The general confirmation process for WIPP waste is presented in Figure B7-1.

~~Permittee waste screening is a two-phased process. Phase I will occur prior to configuring shipments of transuranic (**TRU**) mixed waste. Phase II will occur after the configuration of shipments of TRU mixed waste but before it is placed into storage or disposed at the WIPP facility. Figure B7-1 presents the TRU mixed waste screening process.~~

~~B7-1a Phase I Waste Stream Screening and Verification~~

~~Audits of generator/storage sites will be conducted as part of the Permittees' Audit and Surveillance Program (Permit Attachment B6). The RCRA portion of the generator/storage site audit program will provide on-site verification of waste analysis procedures; Batch Data Report (**BDR**) preparation; and record keeping to assure that all applicable provisions of the WAP requirements are met. As part of the waste analysis data submittal, the generator/storage site will also transmit the data on a container basis via the WIPP Waste Information System (**WWIS**). This data submittal can occur at any time as the data are being collected, but will be complete for each container prior to shipment of that container. The WWIS will conduct internal edit/limit checks as the data are entered, and the data will be available to the Permittees as~~

~~supporting information for WSPF review. NMED will have read-only access to the WWIS as necessary to determine compliance with the WAP. The initial WSPF check performed by the Permittees will include WWIS data submitted by the generator/storage site for each waste container. The Permittees will compare ongoing sampling/waste analysis data obtained and submitted via the WWIS to the approved WSPF. If this comparison shows that containers have hazardous wastes not reported on the WSPF, or a different Waste Matrix Code applies, the data are rejected and the waste containers are not accepted for shipment until a new or revised WSPF is submitted to and approved by the Permittees.~~

~~Another portion of the Phase I verification is the WSPF approval process. At the WIPP facility, this process includes verification that all of the required elements of the WSPF and the Waste Analysis Information Summary are present (Permit Attachment B3) and that the waste analysis information meets acceptance criteria required for compliance with the WAP (Section B-1d).~~

~~If discrepancies regarding hazardous waste number assignment or Waste Matrix Code designation arise as a result of the Phase I review, the generator/storage sites will be contacted by the Permittees and required to provide the necessary additional information to resolve the discrepancy before that waste stream is approved for disposal at the WIPP facility. If the discrepancy is not resolved, the waste stream will not be approved.~~

~~B7-1a(1)~~ Permittees' Audit and Surveillance Program

~~An important part of the Permittees' verification process is the Permittees' Audit and Surveillance Program. The focus of this audit program is compliance with this WAP and the Permit. This audit program addresses the AK implementation process, including waste sampling and analysis activities, and assures compliance with standard operating procedures (**SOPs**) and the WAP. Audits will assure that containers and their associated documentation are adequately tracked throughout the waste handling process. Operator qualifications will be verified, and implementation of quality assurance/quality control (**QA/QC**) procedures will be surveilled. A final report that includes generator/storage site or Permittee approved laboratory audit results and applicable WAP-related corrective action report (**CAR**) resolution will be provided to New Mexico Environment Department (**NMED**) for approval, and will be kept in the WIPP facility operating record until closure of the WIPP facility.~~

~~For generator/storage sites that have NMED approved final audit reports as of the effective date of Permit Attachment B7, those generator/storage sites may continue to comply with the provisions of the Permit in effect prior to the approval of Permit Attachment B7 until the effective date of Permit Attachment B7 or until the next annual recertification audit for that generator/storage site, which ever occurs later.~~

~~A generator/storage site must first prepare a Quality Assurance Project Plan (**QAPjP**), which includes applicable WAP requirements, and submit it to the Permittees for review and approval (Permit Attachment B5). Once approved, a copy of the QAPjP will be provided to NMED. The generator/storage site will implement the specific parameters of the QAPjP after it is approved. An initial audit will be performed after QAPjP implementation and prior to the generator/storage site being certified for shipment of waste to WIPP. Audits will be performed at least annually thereafter, including the possibility of unannounced audits (i.e., not a regularly scheduled audit). These audits will allow NMED to verify that the Permittees have~~

~~implemented the applicable requirements of the WAP and that generator/storage sites have implemented the acceptable knowledge (**AK**) process for the analysis of waste and meet applicable WAP requirements. The Permittees will also audit annually the Permittee approved laboratories performing waste sampling and/or analysis.~~

~~B7-1a(2) WWIS Description~~

~~All generator/storage sites planning to store or dispose of TRU mixed waste at WIPP will supply the required data to the WWIS. The WWIS Data Dictionary includes all of the data fields, the field format and the limits associated with the data as established by this WAP. These data will be subjected to edit and limit checks that are performed automatically by the database, as defined in the *WIPP Waste Information System User's Manual for Use by Shippers/Generators* (DOE, 2001).~~

~~The Permittees will coordinate the data transmission with each generator/storage site. Actual data transmission will use appropriate technology to assure the integrity of the data transmissions. The Permittees will require sites with large waste inventories and large databases to populate a data structure provided by the Permittees that contains the required data dictionary fields that are appropriate for the waste stream (or waste streams) at that site. For example, totals analysis data will not be requested from sites that do not have homogeneous solids or soil/gravel waste. The Permittees will access these data via the Internet to assure an efficient transfer of this data. Small quantity sites will be given a similar data structure by the Permittees that is tailored to their types of waste. Sites with very small quantities of waste will be provided with the ability to assemble the data interactively to this data structure on the WWIS.~~

~~The Permittees will use the WWIS to verify that all of the supplied data meet the edit and limit checks prior to the shipment of any TRU mixed waste to WIPP. The WWIS automatically will notify the generator/storage site if any of the supplied data fails to meet the requirements of the edit and limit checks via an appropriate error message. The generator/storage site will be required to correct the discrepancy with the waste or the waste data and re-transmit the corrected data prior to acceptance of the data by the WWIS. The Permittees will review data reported for each container of each shipment prior to providing notification to the shipping generator/storage site that the shipment is acceptable. Read-only access to the WWIS will be provided to the NMED. Table B7-1 contains a listing of the data fields in the WWIS that are required as part of this Permit, when applicable.~~

~~The WWIS will generate the following:~~

- ~~Waste Emplacement Report~~

  ~~This report will be added to the operating record to track the quantities of waste, date of emplacement, and location of authorized containers or container assemblies in the repository. The Permittees will document the specific panel room or drift that an individual waste container is placed in as well as the row/column/height coordinates location of the container or containers assembly. This report will be generated on a weekly basis. Locations of containers or container assemblies will also be placed on a~~

~~map separate from the WWIS. Reports and maps that are included as part of the operating record will be retained at the WIPP site, for the life of the facility.~~

- ~~Shipment Summary Report~~

~~This report will contain the container identification numbers (**ID**s) of every container in the shipment, listed by Shipping Package number and by assembly number (for seven-packs, four-packs, and three-packs), for every assembly in the Shipping Package. This report is used by the Permittees to verify containers in a shipment and will be generated on a shipment basis.~~

- ~~Waste Container Data Report~~

~~This report will be generated on a waste stream basis and will be used by the Permittees during the WSPF review and approval process. This report will contain the data listed in the Waste Analysis Module on Table B7-1. This report will be generated and attached to the WSPF for inclusion in the facility operating record and will be kept for the life of the facility.~~

- ~~Reports of Change Log~~

~~This will consist of a short report that lists the user ID and the fields changed. The report will also include a reason for the change. A longer report will list the information provided on the short report and include a before and after image of the record for each change, a before-record for each deletion, and the new information for added records. These reports will provide an auditable trail for the data in the database.~~

~~Access to the WWIS will be controlled by the Permittees' Data Administrator (**DA**) who will control the WWIS users based on approval from management personnel.~~

~~The TRU mixed waste generator/storage sites will only have access to data that they have supplied, and only until the data have been formally accepted by the Permittees. After the data have been accepted, the data will be protected from indiscriminate change and can only be changed by an authorized DA.~~

~~The WWIS has a Change Log that requires a reason for the change from the DA prior to accepting the change. The data change information, the user ID of the authorized DA making the change, and the date of the change will be recorded in the data change log. The data change log cannot be revised by any user, including the DA. The data change log will be subject to internal and external audits and will provide an auditable trail for all changes made to previously approved data.~~

~~B7-1a(3) Examination of the Waste Stream Profile Form and Container Data Checks~~

~~The Permittees are responsible for verifying the completeness and accuracy of the WSPF (Permit Attachment B3, Section B3-11b(1)). Figure B7-2 presents the Permittees waste stream approval process. The generator/storage sites shall analyze their waste in accordance~~

~~with the requirements of Permit Attachment B, Waste Analysis Plan, Permit Attachment B1 Waste Analysis Sampling Methods, Attachment B2 Statistical Methods Used in Sampling and Analysis, and Attachment B4 TRU Mixed Waste Analysis Using Acceptable Knowledge, and assure that waste proposed for storage and disposal at WIPP meets the Treatment, Storage, and Disposal Facility-Waste Acceptance Criteria (**TSDF-WAC**) (Permit Conditions II.C.3.a through II.C.3.h.). The generator/storage site shall assemble the AK information into an auditable record[1] for the waste stream as described in Permit Attachment B4. To resolve the assignment of EPA hazardous waste numbers, the generator/storage site shall perform sampling and analysis on a representative sample of the waste stream. Headspace gas sampling and analysis shall be performed on debris waste. Solids sampling and analysis shall be performed for homogeneous solid or soil/gravel waste streams. The sampling and analysis process is depicted in Figure B7-6.~~

~~For those waste streams that have sufficient AK information to assign EPA hazardous waste numbers the generator/storage sites may submit a request to the Permittees for an AK Sufficiency Determination.~~

~~The request will include an AK Summary Report that addresses the following required items:~~

1. ~~Mandatory AK information is available (Permit Attachment B4-2a and B4-2b);~~
2. ~~A waste stream has been properly delineated and meets the HWFP definition of a waste stream (Permit Attachment B4-2b and B-1a);~~
3. ~~The AK process described in the HWFP was followed (for example, AK personnel were appropriately trained; discrepancies in the AK record were documented and resolved (Permit Attachment B4-3a);~~
4. ~~The generator/storage site has developed a written procedure for compiling the AK information and assigning hazardous waste numbers as required by Permit Attachment B4-3b;~~
5. ~~The generator/storage site has assessed the AK process (Permit Attachment B4-3b);~~
6. ~~The generator/storage site has documented evidence that the waste meets the TSDF-WAC (Permit Condition II.C.3.a through II.C.3.h).~~

~~The Permittees will review the request, resolve comments with the generator/storage site and if the Permittees determine that the AK is sufficient, they will provisionally approve the request and forward the request to NMED for an evaluation that the provisional approval made by the Permittees is adequate. Based on the results of the NMED's evaluation, the Permittees will notify the generator/storage sites whether the AK information is sufficient. The Permittees will not approve an AK Sufficiency Determination that the NMED has determined to be inadequate unless the generator/storage site resolves the inadequacies. If the AK information is not sufficient the Permittees will require the generator/storage site to perform sampling and analysis per Permit Attachment B2 and Figure B2-1. In lieu of requesting an AK Sufficiency~~

[1] "Auditable records" mean those records which allow the Permittees to conduct a systematic assessment, analysis, and evaluation of the Permittees compliance with the WAP and this Permit.

~~Determination, the generator/storage site may decide to perform sampling and analysis in accordance with Permit Attachment B2 and Figure B2-1. After a complete AK record has been compiled, the generator/storage site will complete a WSPF and Waste Analysis Information Summary. The Waste Analysis Information Summary will include an AK Summary Report. The assignment of the waste stream description, Waste Matrix Code Group, and Summary Category Groups; the results of waste analyses; the acceptable knowledge summary documentation; the methods used for waste analysis; the Carlsbad Field Office (**CBFO**) certification, and appropriate designation of EPA hazardous waste number(s) will be examined. If the WSPF is inaccurate, efforts will be made to resolve inaccuracies by contacting the generator/storage site in order for the waste stream to be eligible for shipment to the WIPP facility. The WSPF check against waste container data will occur during the initial WSPF approval process.~~

~~The EPA hazardous waste numbers for the wastes that appear on the Waste Stream Profile Form will be compared to those in the WIPP Hazardous Waste Permit Application Part A, Permit Attachment O, to ensure that only approved wastes are accepted for storage or disposal at WIPP. Some of the waste may also be identified by unique state hazardous waste numbers. These wastes are acceptable at WIPP as long as the TSDF-WAC are met. The Waste Analysis Information Summary will be reviewed by the Permittees to verify that the waste has been classified correctly with respect to the assigned EPA hazardous waste numbers. The Permittees will verify that TSDF-WAC compliance has been met by the generator/storage site.~~

~~Waste data transferred via the WWIS after WSPF approval will be compared with the approved WSPF. Any container from an approved hazardous waste stream with a description different from its WSPF will not be received at WIPP.~~

~~The Permittees will also verify that the three different types of data specified below are available for every container holding TRU mixed waste before that waste is transported to WIPP: 1) an assignment of the waste stream's waste description (by Waste Matrix Codes) and Waste Matrix Code Group; 2) a determination of ignitability, reactivity, and corrosivity; and 3) a determination of compatibility. The verification of waste stream description will be performed by reviewing the WWIS for consistency in the waste stream description and WSPF. The Waste Analysis Information Summary will indicate if the waste has been checked for the characteristics of ignitability, corrosivity, and reactivity. The final verification of waste compatibility will be performed using Appendix C1 of the WIPP Resource Conservation and Recovery Act (**RCRA**) Part B Permit Application (DOE, 1997), the compatibility study.~~

~~Any container with unresolved discrepancies associated with hazardous waste analysis will not be stored or disposed at the WIPP facility until the discrepancies are resolved. All shipments of the subject waste stream will cease until the corrective action(s), as necessary, have been implemented and the discrepancy resolved. The Permittees will notify NMED when the certification status of a waste stream at a site is revoked. Waste analysis and certification authority will not be reinstated until the site demonstrates all corrective actions have been implemented and the program is reassessed by the Permittees.~~

~~B7-1a(4) Data Review, Validation, and Verification Requirements at Permittee Level~~

~~The final level of data verification occurs at the Permittee level and must, at a minimum, consist of reviewing a sample of the Batch Data Reports, during audits of the generator/storage sites, to verify completeness. The Permittees are responsible, during audits of the generator/storage sites and Permittee approved laboratories, for the verification that Batch Data Reports include the following:~~

- ~~Project-level signature releases~~
- ~~Listing of all waste containers being presented in the report~~
- ~~Listing of all sampling, and analytical batch numbers associated with each waste container being reported in the package~~
- ~~Analytical Batch Data Report case narratives~~
- ~~Site Project Manager Summary~~
- ~~Data Validation Summary~~
- ~~Complete summarized qualitative and quantitative data for all waste containers with data flags and qualifiers.~~

~~For each WSPF submitted for approval, the Permittees must verify that each submittal (i.e., WSPF and Waste Analysis Information Summary) is complete and notify the originating site in writing of the WSPF approval. For subsequent shipments made after the initial WSPF approval, the verification will also include WWIS internal limit checks (Section B7-1a(2)).~~

~~B7-1a(5) Reconciliation at the Permittee Level~~

~~The Permittees must also assure that data of sufficient type, quality, and quantity are collected to meet WAP Data Quality Objectives (**DQO**s). The Permittees will assure sufficient data have been collected to determine if the waste analysis information is adequate to demonstrate the Permittee's compliance with the HWFP. This is performed during Permittees' review of the WSPF and Waste Analysis Information Summary.~~

~~B7-1b Phase II: Waste Shipment Screening and Verification~~

~~Phase II of the waste shipment screening and verification process includes examination of a waste shipment prior to placement into storage or disposal at the WIPP facility. In Phase II the Permittees will determine: 1) the completeness and accuracy of the EPA Hazardous Waste Manifest; 2) land disposal restriction notice completeness; and 3) waste shipment completeness and container defects. In addition, as part of Phase II activities, the Permittees will perform waste examination activities per Section B7-1b(4) and, as necessary, identify and resolve waste shipment irregularities. Only those waste containers that pass all Phase II waste screening determinations will be eligible for~~

~~storage or disposal at WIPP. For each container stored or disposed of at the WIPP facility, the Permittees shall assure that the generator/storage sites provide the following information:~~

~~Hazardous Waste Manifest Information:~~

- ~~Generator/storage site name and EPA ID~~
- ~~Generator/storage site contact name and phone number~~
- ~~Quantity of waste~~
- ~~List of the hazardous waste numbers in the shipment~~
- ~~Listing of all shipping container IDs (Shipping Package serial number)~~
- ~~Signature of authorized generator representative~~

~~Specific Waste Container information:~~

- ~~Waste stream identification number~~
- ~~List of hazardous waste numbers per container~~
- ~~Certification data~~
- ~~Shipping data (assembly numbers, ship date, shipping category, etc.)~~

~~This information shall also be supplied electronically to the WWIS. The container-specific information will be supplied electronically as described in Section B7-1a(2), and shall be supplied prior to the Permittees' storage or disposal of the waste.~~

~~The Permittees will verify each approved shipment upon receipt at WIPP against the data on the WWIS shipment summary report to assure containers have the required information. A Waste Receipt Checklist will be used to document the verification.~~

~~B7-1b(1) Examination of the EPA Uniform Hazardous Waste Manifest and Associated Waste Tracking Information~~

~~Upon receipt of a TRU mixed waste shipment, the Permittees will make a determination of EPA Uniform Hazardous Waste Manifest completeness and sign the manifest to allow the driver to depart. The Permittees will then make a determination of waste shipment completeness by checking the unique, bar-coded identification number found on each container holding TRU mixed waste against the WWIS.~~

~~The WWIS links the bar-coded identification numbers of all containers in a specific waste shipment to the waste assembly (for 7-packs, 4-packs, and 3-packs) and to the shipment identification number, which is also written on the EPA Hazardous Waste Manifest. For shipments in the RH-TRU 72B cask, only one payload container is bar-coded. For shipments in the CNS 10-160B cask, the~~

~~WWIS links the bar-coded identification numbers of all containers in a specific waste shipment to the shipment identification number, which is also written on the EPA hazardous waste manifest. Generators. electronically transmit the waste shipment information to the WWIS before the TRU mixed waste shipment is transported. Once a TRU mixed waste shipment arrives, the Permittees verify the identity of each cask or container (or one container in a bound 7-pack, 4-pack, or 3-pack) using the data already in the WWIS.~~

~~The WWIS will maintain waste container receipt and emplacement information provided by the Permittees. It will include, among other items, the following information associated with each container of TRU mixed waste:~~

- ~~Package inner containment vessel or shipping cask closure date~~
- ~~Package (container or canister) receipt date~~
- ~~Overpack identification number (if appropriate)~~
- ~~Package (container or canister) emplacement date~~
- ~~Package (container or canister) emplacement location~~

~~Manifest discrepancies may be identified during manifest examination, container bar-code WWIS data comparison, or during waste examination on-site. A manifest discrepancy is a difference between the quantity or type of hazardous waste designated on the manifest and the quantity or type of hazardous waste the WIPP facility actually receives. The generator/storage site technical contact (as listed on the manifest) will be contacted to resolve the manifest discrepancy. If the manifest discrepancy is identified prior to the containers being removed from the package or shipping cask, the waste will be retained in the parking area holding area. If the discrepancy is identified after the waste containers are removed from the package or cask, the waste will be retained in a waste holding area until the manifest discrepancy is resolved If the discrepancy is identified after the waste containers are removed from the package or cask, the waste will be retained in a waste staging area until the manifest discrepancy is resolved. Errors on the manifest can be corrected by the WIPP facility with a verbal (followed by a mandatory written) concurrence by the generator/storage site technical contact. All manifest discrepancies that are unresolved within fifteen (15) days of receiving the waste will be immediately reported to the NMED in writing. Notifications to the NMED will consist of a letter describing the manifest discrepancies, discrepancy resolution, and a copy of the manifest. If the Waste Isolation Pilot Plant manifest discrepancies have not been resolved within sixty (60) days of waste receipt, the shipment will be returned to a generator/storage facility or another off-site facility. If it becomes necessary to return waste containers to a generator/storage site, a new EPA Uniform Hazardous Waste Manifest may be prepared by the Permittees.~~

~~Documentation of the returned containers will be recorded in the WWIS. Changes will be made to the WWIS data to indicate the current status of the container(s) The reason for the WWIS data change and the record of the WWIS data change will be maintained in the change log of the WWIS, which will provide an auditable record of the returned shipment.~~

~~The Permittees will be responsible for the resolution of discrepancies, notification of the NMED, as well as returning the original copy of the manifest to the generator/storage site.~~

~~B7-1b(2) Examination of the Land Disposal Restriction (**LDR**) Notice~~

~~TRU mixed waste designated by the Secretary of Energy for disposal at WIPP is exempt from the LDRs by the Land Withdrawal Act Amendment (Public Law 104-201). This amendment states that WIPP "Waste is exempted from treatment standards promulgated pursuant to section 3004(m) of the Solid Waste Disposal Act (42 U.S. C. 6924(m)) and shall not be subjected to the Land Disposal prohibitions in section 3004(d), (e), (f), and (g) of the Solid Waste Disposal Act." Therefore, with the initial shipment of a TRU mixed waste stream, the generator shall provide the Permittees with a one time written notice. The notice must include the information listed below:~~

~~Land Disposal Restriction Notice Information:~~

- ~~EPA Hazardous Waste Number(s) and Manifest Numbers of first shipment of a mixed waste stream~~
- ~~Statement: this waste is not prohibited from land disposal~~
- ~~Date the waste is subject to prohibition~~

~~This information is the applicable information taken from column "268.7(a)(4)" of the "Generator Paperwork Requirements Table" in 20.4.1.800 NMAC (incorporating 40 CFR 268.7(a)(4)). Note that item "5" from the "Generator Paperwork Requirements Table" is not applicable since waste analysis data are provided electronically via the WWIS and item "7" is not applicable since waste designated by the Secretary of Energy for disposal at WIPP is exempted from the treatment standards.~~

~~The Permittees will review the LDR notice for accuracy and completeness. The generator will prepare this notice in accordance with the applicable requirements of 20.4.1.800 NMAC (incorporating 40 CFR §268.7(a)(4)).~~

~~B7-1b(3) Verification~~

~~The Permittees will determine whether there are any TRU mixed waste irregularities. The following items will be inspected for each TRU mixed waste shipment arriving at the WIPP facility:~~

- ~~Whether the number and type of containers holding TRU mixed waste match the information in the WWIS~~
- ~~Whether there are any container defects.~~

~~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 B7-1). 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 examined by the Permittees per Section B7-1b(4) of the WAP at an off-site facility, the containers will be approved for storage or disposal at the WIPP facility.~~

B7-1~~b(4)~~a Permittees' ~~Examination~~ Confirmation of a Representative Subpopulation of the Waste

The Permittees shall ~~determine~~ confirm that the waste contains no ignitable, corrosive, or reactive waste through radiography (Section B7-1~~b(5)~~b) or the use of visual examination (Section B7-1~~b(6)~~c) of a statistically representative subpopulation of the waste. Waste ~~examination~~ confirmation will be performed on randomly selected containers from each waste stream shipment of TRU mixed waste prior to storage or disposal at WIPP. Both CH and RH TRU mixed waste will be verified and ~~examined~~ confirmed at a generator/storage site before shipment to WIPP.

~~The CH TRU mixed waste examination may will be performed either on-site after the shipment is received or at an off-site facility (e.g., generator/storage site) prior to receipt.~~ Figure B7-~~3~~1 presents the overall waste verification and ~~examination~~ confirmation process. Figure B7-~~4~~2 presents the waste examination process at the generator /storage sites (or off-site facilities). ~~Figure B7-5 presents the waste examination process at WIPP.~~

The Permittees' ~~examination of the~~ waste confirmation encompasses ~~verification~~ ensuring that the physical characteristics of the TRU mixed waste correspond with its waste stream description and that the waste does not contain liquids in excess of TSDF-WAC limits or compressed gases. These techniques can detect liquids that exceed 1 percent volume of the container and containerized gases, which are prohibited from storage or disposal at the WIPP facility. The prohibition of liquids and containerized gases prevents the storage or disposal of ignitable, corrosive, or reactive wastes. Radiography and/or visual examination will ~~assure~~ ensure that the physical form of the waste matches its waste stream description (i.e., Homogeneous Solids, Soil/Gravel, or Debris Waste). ~~Because containers of waste will not be opened at the WIPP site, visual examination at WIPP will be based on the Permittee' review of video and audio recordings by the generator/storage site of the visual examination of the waste, or by review of the generator's visual examination records (i.e., visual examination data forms or packaging logs).~~ The results of the Permittees' waste ~~examination~~ confirmation activities, including radiography and visual examination records (data sheets, packaging logs, and/or video and audio recordings) will be maintained in the WIPP facility operating record. Noncompliant waste identified during waste ~~examination~~ confirmation will be managed as described in Section B7-~~1b(9)~~2.

The Permittees shall randomly select 7 percent of each waste stream shipment for ~~examination~~ waste confirmation. This equates to a minimum of one container from each fourteen containers in each waste stream in each designated shipment. If there are less than fourteen containers from a waste stream in a particular shipment, a minimum of one container from the waste stream shipped will be selected. If the random selection of containers in a shipment occurs prior to loading the waste containers into the Shipping Package, the randomly selected containers may be consolidated into a single Type B package consistent with transportation requirements. Documentation of the random selection of containers for waste ~~examination~~ confirmation will be placed in the WIPP facility operating record.

B7-1~~b(5)~~b Radiography Methods Requirements

Radiography has been developed by the Permittees specifically to aid in the examination and identification of containerized waste. The Permittees shall describe all activities required to achieve the radiography objectives in standard operating procedures (**SOPs**). These SOPs shall include instructions specific to the radiography system(s) used by the Permittees ~~either at the WIPP site or~~ at an off-site facility (e.g., the generator/storage site). For example, to detect liquids, some systems require the container to be rotated back and forth while other systems require the container to be tilted.

A radiography system (e.g., real time radiography, digital radiography/computed tomography) normally consists of an X-ray-producing device, an imaging system, an enclosure for radiation protection, a waste container handling system, a video and audio recording system, and an operator control and data acquisition station. Although these six components are required, it is expected there will be some variation within a given component between radiography systems. The radiography system shall have controls or an equivalent process which allow the operator to control image quality. On some radiography systems, it should be possible to vary the voltage, typically between 150 to 400 kilovolts (**kV**), to provide an optimum degree of penetration through the waste. For example, high-density material should be examined with the X-ray device set on the maximum voltage. This ~~assures~~ ensures maximum penetration through the waste container. Low-density material should be examined at lower voltage settings to improve contrast and image definition. The imaging system typically utilizes either a fluorescent screen and a low-light television camera or x-ray detectors to generate the image.

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 in the WIPP facility operating record as a non-permanent record. A radiography data form is also used to document the Waste Matrix Code, ~~and assure~~ ensure that the waste container contains no ignitable, corrosive, or reactive waste by ~~assuring~~ 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 Permittees certify 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 WIPP facility operating record.

For containers which contain classified shapes and undergo radiography, the radiography will occur at a facility with appropriate security provisions and the video and audio recording will be considered classified. The radiography data forms will not be considered classified.

B7-1~~b(5)(i)~~b(1) Radiography Training

The radiography system involves qualitative and semiquantitative evaluations of visual displays. Operator training and experience are the most important considerations for ~~assuring~~ 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.

The Permittee radiography operators performing waste ~~examination~~ confirmation shall be trained in accordance with the requirements of Permit Attachment H1.

B7-1~~b(5)(ii)~~b(2) Radiography Oversight

A training drum with internal containers of various sizes shall be scanned biannually by each operator. The video and audio media shall then be reviewed by a supervisor to ~~assure~~ ensure that operators' interpretations remain consistent and accurate. Imaging system characteristics shall be verified on a routine basis.

Independent replicate scans and replicate observations of the video output of the radiography process shall be performed under uniform conditions and procedures. Independent replicate scans shall be performed on one waste container per day or once per shipment, whichever is less frequent. Independent observations of one scan (not the replicate scan) shall also be made once per day or once per shipment, whichever is less frequent, by a qualified radiography operator other than the individual who performed the first examination.

The Permittees shall be responsible for monitoring the quality of the radiography data and calling for corrective action, when necessary.

B7-1~~b(6)~~c Visual Examination Methods Requirements

Visual examination **(VE)** may also be used as a waste ~~examination~~ confirmation method by the Permittees. ~~Visual examination~~ VE shall be conducted by the Permittees in accordance with written ~~standard operating procedures~~ SOPs to describe the contents of a waste container. The description shall clearly identify ~~the~~ all discernible waste items, residual materials, packaging materials, or waste material parameters. ~~Visual examination~~ VE may be used by the Permittees to examine a statistically representative subpopulation of the waste received at the WIPP to ~~assure~~ confirm that the waste contains no ignitable, corrosive, or reactive waste. This is achieved by ~~assuring~~ confirming that the waste contains no residual liquids in excess of TSDF-WAC limits or compressed gases, and that the physical form of the waste matches the waste stream description documented on the WSPF. A ~~visual examination~~ VE data form is used to document this information. During packaging, the waste container contents are directly examined by trained personnel. This form of waste ~~examination~~ confirmation may be performed by the Permittees at ~~the WIPP site or at an off-site facility, e.g.,~~ a generator/storage site. The ~~visual examination~~ VE may be recorded on video and audio media, or alternatively, by using a second operator to provide additional verification by reviewing the contents of the waste container to ~~assure~~ ensure correct reporting.

~~Because waste containers will not be opened at the WIPP site and~~ In order to keep radiation doses as low as reasonably achievable at ~~a~~ generator/storage sites, the Permittees may use their own trained VE operators to perform VE ~~visual examination~~ for waste confirmation ~~examination may be performed~~ by reviewing~~, by trained Permittee visual examination operators, of~~ video media prepared by the generator/storage site during their ~~visual examination~~ VE of the waste. If the Permittees perform waste ~~examination~~ confirmation by review of video media, the video record of the ~~visual examination~~ VE must be sufficiently complete for the Permittees to ~~assure~~ confirm the Waste Matrix Code and waste stream description, and verify the waste contains no residual liquids in excess of TSDF-WAC limits or compressed gases. Generator/storage site VE video/audio media subject to review by the Permittees shall meet the following minimum requirements:

- The video/audio media shall record the waste packaging event for the container such that all waste items placed into the container are recorded in sufficient detail that a trained Permittee VE expert can determine what the waste items are and their associated waste material parameter.

- The video/audio media shall capture the waste container identification number.

- The personnel loading the waste container shall be identified on the video/audio media or on packaging records traceable to the loading of the waste container.

- The date of loading of the waste container will be recorded on the video/audio media or on packaging records traceable to the loading of the waste container.

The Permittees may also use their own trained VE operators to perform VE ~~Visual examination~~ for waste confirmation ~~examination may also be performed~~ by reviewing VE~~, by trained Permittee visual examination operators, of visual examination~~ data forms or packaging logs prepared by the generator during their packaging of the waste. To be acceptable, the generator/storage site ~~visual examination~~ VE data must be signed by two generator/storage site personnel who witnessed the packaging of the waste and must provide sufficient information for the Permittees to determine that the waste container 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 ~~visual examination~~ VE data on Permittee ~~visual examination~~ 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.

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

B7-1~~b(6)(i)~~c(1) Visual Examination Training

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

B7-1~~b(6)(ii)~~c(2) Visual Examination Oversight

The Permittees shall designate a ~~visual examination~~ VE expert. The ~~visual examination~~ VE expert shall be familiar with the waste generating processes that have taken place at each site and with all of the types of waste being characterized at each site where ~~were used to generate the~~ waste streams will be~~ing examined~~ confirmed using VE. The ~~visual examination~~ VE expert shall be responsible for the overall direction and implementation of the Permittee~~'~~s' VE ~~visual examination~~ program. The Permittees shall specify the selection, qualification, and training requirements of the visual examination expert in an SOP.

B7-1~~b(7)~~d 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.

B7-1~~b(7)(i)~~d(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.

Precision

Precision is maintained by reconciling any discrepancies between two radiography operators with regard to the waste stream waste ~~examination~~ confirmation, identification of liquids in excess of TSDF-WAC limits, and identification of compressed gases through independent replicate scans and independent observations.

Accuracy

Accuracy is obtained by using a target to tune the image for maximum sharpness and by requiring operators to successfully identify 100 percent of the required items in a training container during their initial qualification and subsequent requalification.

Representativeness

Representativeness is ~~assured~~ ensured by performing radiography on a random sample of waste containers from each waste stream in each shipment.

Completeness

A video and audio media recording of the radiography examination and a validated radiography data form will be obtained for 100 percent of the waste containers subject to radiography.

Comparability

The comparability of radiography data from different operators shall be enhanced by using standardized radiography procedures and operator qualifications.

B7-1~~b(7)(ii)~~d(2) Visual Examination QAOs

Results must be recorded on a ~~visual examination~~ VE data form. The precision, accuracy, representativeness, completeness, and comparability objectives for ~~visual examination~~ VE data are presented below.

Precision

Precision is maintained by reconciling any discrepancies between the operator and the independent technical reviewer with regard to the waste stream waste ~~examination~~ confirmation, identification of liquids in excess of TSDF-WAC limits, and identification of compressed gases.

Accuracy

Accuracy is maintained by requiring operators to pass a comprehensive examination and demonstrate satisfactory performance in the presence of the VE expert during their initial qualification and subsequent requalification.

Representativeness

Representativeness is ~~assured~~ ensured by performing ~~visual examination~~ VE on a random sample of waste containers within each waste stream in each shipment.

Completeness

A validated ~~visual examination~~ VE data form will be obtained for 100 percent of the waste containers subject to ~~visual examination~~ VE.

Comparability

The comparability of VE data from different operators shall be enhanced by using standardized VE procedures and operator qualifications.

B7-1~~b(8)~~e Review and Validation of Radiography and Visual Examination Data Used for Waste Examination

This section describes the requirements for review and validation of radiography and ~~visual examination~~ VE data by the Permittees.

B7-1~~b(8))(i)~~e(1) Independent Technical Review

The radiography and/or ~~visual examination~~ VE confirmation data for each shipment shall receive an independent technical review. This review will be performed before the affected waste shipment is ~~stored or disposed of at~~ shipped to the WIPP facility. The review shall be performed by an individual other than the data generator who is qualified to have performed the work. The review will be performed in accordance with approved Permittee SOPs and will be documented on a review checklist. The reviewer(s) must approve the data as evidenced by signature, and as a consequence, ~~assure~~ ensure the following:

- Data generation and reduction were conducted in a technically correct manner in accordance with the methods used (procedure with revision). Data were reported in the proper units and correct number of significant figures.

- The data have been reviewed for transcription errors.

- Radiography video and audio media recordings have been reviewed (independent observation) on a waste container basis at a minimum of once per shipment or once per day of operation, whichever is less frequent. The radiography video/audio recording will be reviewed against the data reported on the radiography form to ~~assure~~ ensure that the data are correct and complete.

B7-1~~b(8)(ii)~~e(2) Permittee Management Review

The radiography and/or visual examination data for each shipment shall receive a Permittee management review. This review will be performed before the affected waste shipment is disposed of at the WIPP. The review shall be performed by a designated member of Permittee management. The review will be performed in accordance with approved Permittee SOPs and will be documented on a review checklist. The reviewer(s) must approve the data as evidenced by signature, and as a consequence, ~~assure~~ ensure the following:

- The data are technically reasonable based on the technique used.

- The data have received independent technical review.

- The data indicate that the waste examined contained no ignitable, corrosive, or reactive waste and that the physical form of the waste was consistent with the waste stream description in the WSPF.

- QC checks have been performed (e.g., replicate scans, image quality checks).

- The data meet the established QAOs

Upon completion of the Permittee management review, the waste ~~examination~~ confirmation data for the shipment shall be submitted to the WIPP facility operating record. Waste ~~examination~~ confirmation data includes~~;~~ radiography and ~~visual examination~~ VE data forms, video/audio media, and review checklists.

B7-~~1b(9)~~2 Noncompliant Waste Identified During Waste ~~Examination~~ Confirmation

If the Permittees identify noncompliant waste during waste ~~examination~~ confirmation at a generator/storage site~~, the Permittees identify noncompliant waste~~ (i.e., the waste does not match the waste stream description documented in the WSPF or there are liquids in excess of TSDF-WAC limits or compressed gases) the waste will not be shipped. ~~Shipments of the affected waste stream will be suspended and will not resume until discrepancies have been satisfactorily resolved.~~

~~If during waste examination at WIPP the Permittees identify noncompliant waste, the Permittees will determine if this constitutes a manifest discrepancy and, if so, comply with the manifest discrepancy reporting requirements of Section B7-1b(1). When discrepancies relative to waste form or prohibited items cannot be resolved with the generator/storage sites, the entire shipment or the non-conforming portion of the shipment, will be returned to a generator/storage site or another off-site facility.~~ The Permittees will suspend further shipments of the affected waste stream and issue a CAR to the generator/storage site. Shipments of the affected waste stream shall not resume until the CAR has been closed. ~~The~~ NMED will be notified within 24 hours of any suspension of waste stream shipments due to the identification of nonconforming waste during waste ~~examination~~ confirmation. ~~The Permittees may, at their discretion, continue to examine all containers in the waste stream shipment and dispose of the conforming containers.~~

As part of the corrective action plan in response to the CAR, the generator/storage site will evaluate whether the waste ~~analysis~~ characterization information documented in the ~~Waste Analysis~~ Characterization Information Summary and/or WSPF for the waste stream must be updated because the results of waste ~~examination~~ confirmation for the waste stream indicated that the TRU mixed waste being examined did not match the waste stream description. If the ~~Waste Analysis~~ Characterization Information Summary and/or WSPF requires revision, shipments of the affected waste stream shall not resume until the revised waste stream waste ~~analysis~~ characterization information has been reviewed and approved by the Permittees. ~~Waste streams that have discrepancies that cannot be resolved will be returned to a generator/storage site.~~ Repeated nonconformances by a site in implementing ~~and documenting~~ WAP requirements (Permit Attachment B) will result in the termination of storage or disposal of the site's waste, waste stream(s), or summary category group(s), as applicable. Management, storage, or disposal of the subject waste summary category at WIPP will not resume until the Permittees find that all corrective actions have been implemented and the site complies with all applicable requirements of the WAP.

~~B7-2 Waste Shipment Screening QA/QC~~

~~Waste shipment screening QA/QC assures that TRU mixed waste received is that which has been approved for shipment during the Phase I and 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.~~

~~B7-3 Permittees' Corrective Action Process~~

~~The Permittees shall initiate a corrective action process when internal nonconformances and nonconformances at the generator/storage sites are identified. Activities and processes that do not meet requirements are documented as deficiencies.~~

~~When a deficiency is identified by the Permittees, the following process action steps are required:~~

- ~~The condition is documented on a Corrective Action Report (**CAR**) by the individual identifying the problem.~~
- ~~The Permittees have designated the CAR Initiator and Assessment Team Leader to review the CAR, determine validity of the finding (determine that a requirement has been violated), classify the significance of the condition, assign a response due date, and issue the CAR to the responsible party.~~
- ~~The responsible organization reviews the CAR, evaluates the extent and cause of the deficiency and provides a response to the Permittees, indicating remedial actions and actions to preclude recurrence that will be taken.~~
- ~~The Permittees review the response from the responsible organization and, if acceptable, communicate the acceptance to the responsible organization.~~
- ~~The responsible organization completes remedial actions and actions to preclude recurrence of the condition.~~
- ~~After all corrective actions have been completed, the Permittees schedule and perform a verification to assure that corrective actions have been completed and are effective. When all actions have been completed and verified as being effective, the CAR is closed by the CAR Initiator and Assessment Team Leader on behalf of the Permittees.~~
- ~~As part of the planning process for subsequent audits and surveillances, past deficiencies are reviewed and the previous deficient activity or process is subject to reassessment.~~

~~B7-4 Records Management and Reporting~~

~~As part of the WIPP facility's operating record, data and documents associated with waste analysis and examination data are managed in accordance with standard records management practices. All waste analysis data for each TRU mixed waste container transmitted to WIPP and generated by the Permittees 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 Federal Records Center 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.~~

~~The storage of the Permittees' copy of the manifest, LDR information, waste analysis data, WSPFs, waste examination activities, and other related records will be identified on the appropriate records inventory and disposition schedule.~~

~~Waste analysis and waste examination data and documents are part of the WIPP facility operating record are managed in accordance with the following guidelines:~~

~~B7-4a General Requirements~~

- ~~Records shall be legible~~
- ~~Corrections shall be made with a single line through the incorrect information, and the date and initial of the person making the correction shall be added~~
- ~~Black ink is encouraged, unless a copy test has been conducted to assure the other color ink will copy~~
- ~~Use of highlighters on records is discouraged~~
- ~~Records shall be reviewed for completeness~~
- ~~Records shall be validated by the cognizant manager or designee~~

~~B7-4b Records Storage~~

- ~~Active records shall be stored when not in use~~
- ~~Quality records shall be kept in a one-hour (certified) fire-rated container or a copy of a record shall be stored separately (sufficiently remote from the original) in order to prevent destruction of both copies as a result of a single event such as fire or natural disaster~~
- ~~Unauthorized access to the records is controlled by locking the storage container or controlling personnel access to the storage area~~

~~The following records will be maintained for waste analysis purposes as part of the WIPP facility operating record:~~

- ~~Completed WIPP WSPFs and accompanying Waste Analysis Information Summary, including individual container data as transferred on the WWIS (or received as hard-copy) and any discrepancy-related documentation as specified in Section B7-1a(3).~~

- ~~Radiography and visual examination records (data sheets, packaging logs, and video and audio recordings) of waste examination activities~~

- ~~Completed Waste Receipt Checklists and discrepancy-related documentation as specified in Section B7-1b.~~

- ~~WIPP WWIS Waste Emplacement Report as specified in Section B7-1a(2)~~
- ~~Audit reports and corrective action reports from the Permittees' Audit and Surveillance Program audits as specified in Section B7-1a(1) and Permit Attachment B6~~
- ~~CARs and closure information for corrective actions taken due to nonconforming waste being identified during waste examination by the Permittees~~

~~These records will be maintained for each TRU mixed waste managed at the WIPP facility.~~

~~B7-5 Reporting~~

~~The Permittees will provide a biennial report in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.75) to NMED that includes information on actual volume and waste descriptions received for disposal during the time period covered by the report.~~

~~B7-6 List of References~~

~~U.S. Department of Energy (DOE), 2001, "WIPP Waste Information System User's Manual for Use by Shippers/Generators", DOE/CAO 97-2273, U.S. Department of Energy.~~

~~U.S. Department of Energy (DOE), 1997, Resource Conservation and Recovery Act Part B Permit Application for the Waste Isolation Pilot Plant", Revision 6.5, U.S. Department of Energy.~~

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~~TABLES~~

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~~TABLE B7-1~~
~~WIPP WASTE INFORMATION SYSTEM DATA FIELDS~~[a]

~~Characterization Module Data Fields~~[b]	
~~Container ID~~[c]	~~Total VOC Sample Date~~[e]
~~Generator EPA ID~~	~~Total VOC Analysis Date~~[e]
~~Generator Address~~	~~Total VOC Analyte Name~~[d,e]
~~Generator Name~~	~~Total VOC Analyte Concentration~~[d,e]
~~Generator Contact~~	~~Total Metal Sample Date~~[e]
~~Hazardous Code Number~~	~~Total Metal Analysis Date~~[e]
~~Headspace Gas Sample Date~~	~~Total Metal Analyte Name~~[d,e]
~~Headspace Gas Analysis Date~~	~~Total Metal Analyte Concentration~~[d,e]
~~Layers of Packaging~~	~~Semi-VOC Sample Date~~[e]
~~Liner Exists~~	~~Semi-VOC Analysis Date~~[e]
~~Liner Hole Size~~	~~Semi-VOC Analyte Name~~[d,e]
~~Filter Model~~	~~Semi-VOC Concentration~~[d,e]
~~Number of Filters Installed~~	~~Transporter EPA ID~~
~~Headspace Gas Analyte~~[d,e]	~~Transporter Name~~
~~Headspace Gas Concentration~~[d,e]	~~Visual Exam Container~~
~~Headspace Gas Char. Method~~[d,e]	~~Waste Material Parameter~~[d]
~~Total VOC Char. Method~~[d,e]	~~Waste Material Weight~~[d]
~~Total Metals Char. Method~~[d,e]	~~Waste Matrix Code~~
~~Total Semi-VOC Char. Method~~[d,e]	~~Waste Matrix Code Group~~
~~Item Description Code~~	~~Waste Stream Profile Number~~
~~Haz. Manifest Number~~	
~~NDE Complete~~[f]	
~~Certification Module Data Fields~~	
~~Container ID~~[c]	~~Handling Code~~
~~Container type~~	
~~Container Weight~~	
~~Contact Dose Rate~~	
~~Container Certification date~~	
~~Container Closure Date~~	
~~Transportation Data Module~~	
~~Shipping Package Number~~	~~Ship Date~~
~~Assembly Number~~[g]	~~Receive Date~~
~~Container IDs~~[c,d]	
~~ICV Closure Date~~	
~~Disposal Module Data~~	
~~Container ID~~[c]	
~~Disposal Date~~	
~~Disposal Location~~	

[a] ~~This is not a complete list of the WWIS data fields.~~

[b] ~~Some of the fields required for waste analysis are also required for certification and/or transportation.~~

~~[c] Container ID is the main relational field in the WWIS Database.~~

~~[d] This is a multiple occurring field for each analyte, nuclide, etc.~~

~~[e] This is only reported for containers sampled~~

~~[f] These are logical fields requiring only a yes/no.~~

~~[g] Required for 7-packs of 55-gal drums, 4-packs of 85-gal drums, or 3-packs of 100-gal drums to tie all of the drums in that assembly together. This facilitates the identification of waste containers in a shipment without need to breakup the assembly.~~

FIGURES

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Figure B7-1
Waste Confirmation Process

Figure B7-2
Waste Confirmation at an Offsite Facility

ATTACHMENT C

SECURITY

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ATTACHMENT C

SECURITY

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ATTACHMENT C

SECURITY

Introduction

This Permit Attachment describes the security measures taken at the Waste Isolation Pilot Plant (**WIPP**) during the Disposal Phase. It describes the security equipment and procedures in place at the WIPP facility that continuously monitor and control entry onto the active portion[1] of the facility, including 24-hour security surveillance, fencing, and signs.

C-1 Security

The security requirements contained in Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1 (20.4.1.500 NMAC (incorporating 40 CFR §264.14)), and in 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(4)), require that security be provided by 24-hour surveillance or that a barrier be provided to control entry to the active portion of the facility at all times.

C-1a Security Procedures and Equipment

The WIPP facility has been designed and will be operated to fully meet the security requirements contained in 20.4.1.500 NMAC (incorporating 40 CFR §264.14(b) and (c)). The WIPP facility has 24-hour security surveillance and the means to control entry to the active portion of the facility. In addition, warning signs are provided. These security requirements are discussed below.

C-1a(1) 24-Hour Surveillance System

The WIPP facility's 24-hour surveillance system is comprised of security officers that provide protection 24 hours per day, 365 days per year. Security officers work to written procedures that require visitors, contractors, and vendors to log in before they are allowed to proceed to the Main Gate for access into the Property Protection Area (**PPA**) and require continuous monitoring of the active portion of the facility. This system will be maintained to fulfill the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.14(b)(1)).

The major duties of the security officers are to control personnel, vehicle, and material access/egress 24 hours per day, 365 days per year. During non-operational hours, the security officers conduct documented security patrols outside of the PPA, at a minimum rate of two per

[1] The active portion of the facility is the Property Protection Area (**PPA**) as described in Permit Module III. Within this area, the only area where transuranic (**TRU**) mixed wastes are handled outside of the Contact-Handled or Remote-Handled Packaging is inside the Waste Handling Building (**WHB**), the waste hoist, and the underground. Whenever TRU mixed waste is handled, a Controlled Area (**CA**) is established, for the purpose of radiation protection, which limits access to only trained personnel or to untrained personnel (visitors) who are continuously under the escort of trained personnel. CAs are established in accordance with the WIPP Radiation Safety Manual and are managed to limit the radiation exposure to personnel to less than 100 millirem per year. The CA is initially set at the entrances to the Parking Area Container Storage Unit (Parking Area Unit), Waste Handling Building Container Storage Unit (WHB Unit) Bay, and portions of the underground. The boundary of the CA is posted with signs as specified by the Permittees.

12-hour shift. Whenever scheduled security patrols cannot be made, for situations such as inclement weather or an emergency, the reason for missing the patrol will be documented in the security logbook. In addition to the security officers, WIPP facility employees are called upon to challenge any person in the WIPP facility who is not wearing a badge or who is not under escort when an escort is required. Further physical protection is provided by fences, protective lighting, and locked buildings.

C-1a(2) Barrier and Means to Control Entry

The existence of a barrier and a means to control entry demonstrates compliance with 20.4.1.500 NMAC (incorporating 40 CFR §264.14(b)(2)). Each is discussed in detail in the following sections.

C-1a(2)(a) Barrier

The surface portion of the WIPP facility PPA is contained within a 35 acre (14 hectare) fenced area. This area is surrounded by a permanent 7 foot (ft) (2.13 meter [m]) high chain-link fence that is topped by three strands of barbed wire, for a total height of 8 ft (2.44 m). The fence encloses major surface structures. The regularly inspected chain-link fencing at the WIPP facility completely surrounds the active portion of the facility, thereby complying with 20.4.1.500 NMAC (incorporating 40 CFR §264.14(b)(2)(i)). Access is normally through the Main Gate on the west side of the PPA. Two other gates are available for emergency use. One of these gates is opened to allow salt trucks access to the salt pile. Use of all gates is under the supervision of security.

C-1a(2)(b) Means to Control Entry

Entry into the PPA, whether by personnel or vehicles, is through controlled gates and doors. WIPP-facility access-control procedures are designed to ensure that only properly identified and authorized persons, vehicles, and property are allowed entrance to and exit from the facility. A personnel identification and access control system is maintained within the facility. Employees identify themselves with an identification badge when entering or leaving the premises. Security officers require visitors to show proper authorization prior to allowing them to enter the facility. In addition, visitors are required to wear a temporary badge and may require an authorized escort. Because the WIPP facility controls entry to the active portion of the facility at all times, the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.14(b)(2)(ii)), are met.

For the purposes of entry control to areas where wastes are being handled, the Waste Handling Building Container Storage Unit (**WHB Unit**), the boundaries of the Parking Area Unit south of the WHB, and those portions of the underground where wastes are disposed are posted as Controlled Areas (**CAs**). The WIPP allows access to a CA by anyone who has successfully completed General Employee Radiological Training, which is included in the General Employee Training Course. Access for visitors can also be arranged with proper training.

Areas within the CA, however, may have further access restricted. Smaller areas may be designated as Radiological Buffer Areas, Radiation Areas, and Radioactive Materials Area. These smaller areas are generally within the direct vicinity of waste handling activities or waste storage or disposal areas. They are sized and posted in accordance with strict guidelines. Activities in these areas are performed under a Radiological Work Permit (**RWP**), and personnel must be listed on the RWP before they are allowed to enter. To be listed on the RWP, personnel must have the appropriate radiological and hazardous waste worker training and must have available radiation dose for the task. In addition, the individuals must sign the RWP acknowledging that they intend to comply with the radiological controls that are in place. Personnel may be escorted into the smaller areas if they are escorted by a person who meets all of the above requirements and is not performing any work in the area.

The WHB Unit, the Parking Area Unit, and the underground Hazardous Waste Disposal Units (HWDUs) will be posted with a sign that states: "Danger: Authorized Personnel Only" in both English and Spanish.

C-1a(3) Warning Signs

The permanent chain-link fence surrounding the PPA is posted at approximately 50 ft (15.24 m) intervals with "No Trespassing" signs and with "Danger: Authorized Personnel Only" signs in English and Spanish. The signs are legible from a distance of 25 ft (7.62 m) and can be seen from any approach to the facility. These same signs, plus security and traffic signs, are also located on the controlled gates. The fence and gate signs at the WIPP facility fully comply with 20.4.1.500 NMAC (incorporating 40 CFR §264.14(c)). Warning signs with "Controlled Area" and "Hazardous Waste Management Unit" will be posted at entrances to the HWDUs prior to the emplacement of waste.

ATTACHMENT D

INSPECTION SCHEDULE, PROCESS AND FORMS

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ATTACHMENT D

INSPECTION SCHEDULE, PROCESS AND FORMS

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ATTACHMENT D

INSPECTION SCHEDULE, PROCESS AND FORMS

Introduction

This Permit Attachment describes the facility inspections (including container inspections) that are conducted to detect malfunctions, deterioration, operator errors, and discharges that may cause or lead to releases of hazardous waste or hazardous waste constituents to the environment or that could be a threat to human health.

D-1 Inspection Schedule

Equipment instrumental in preventing, detecting, or responding to environmental or human health hazards, such as monitoring equipment, safety and emergency equipment, security devices, and operating or structural equipment are inspected. The equipment will be inspected for malfunctions, deterioration, potential for operator errors, and discharges which could lead to a release of hazardous waste constituents to the environment or pose a threat to human health.

The WIPP facility has developed and will maintain a series of written procedures that include all the detailed inspection procedures and forms necessary to comply with 20.4.1.500 NMAC (incorporating 40 CFR §264.15(b)), during the Disposal Phase. Tables D-1 and D-1a list~~s~~ each item or system requiring inspection under these regulations, the inspection frequency, the organization responsible for the inspection, the applicable inspection procedure, and what to look for during the inspection. 20.4.1.500 NMAC (incorporating 40 CFR §§264.15(b), 264.174, and 264.602) list requirements that are applicable to the WIPP facility.

Operational procedures detailing the inspections required under 20.4.1.500 NMAC (incorporating 40 CFR §§264.15(a) and (b)), are maintained in electronic format on the WIPP computer network, in the Operating Record and, as appropriate, in controlled document locations at the WIPP facility. Frequency of inspections is discussed in detail in Section D-1a(2). Inspections are conducted often enough to identify problems in time to correct them before they pose a threat to human health or the environment and are based on regulatory requirements. The operational procedures assign responsibility for conducting the inspection, the frequency of each inspection, the types of problems to be watched for, what to do if items fail inspection, directions on record keeping, and inspector signature, date, and time. The operational procedures are maintained at the WIPP facility. Tables D-1 and D-1a summarize~~s~~ inspections, frequencies, responsible organizations, personnel making the inspection (by job title), and the types of anticipated problems as well as the references for the operational procedures. Inspection records are maintained at the WIPP site for three years by the responsible organization shown in Tables D-1 and D-1a.

Waste handling equipment and area inspections are typically controlled through established procedures and the results are recorded in logbooks or on data sheets. Operators are trained to consult the logbook to identify the status of any piece of waste handling equipment prior to its use. Once a piece of equipment is identified to be operable, a preoperational inspection is initiated in accordance with the appropriate inspection procedure in Tables D-1. D-1a, or in operational procedures. Inspection results as described below are entered in the applicable logbook.

Inspections include identifying malfunctions or deteriorating equipment and structures. Inspection results and data, including deficiencies, discrepancies, or needed repairs are recorded. A negative inspection result does not necessarily lead to a repair. A deficiency, such as low fluid level, may be corrected by the inspector immediately. A discrepancy, such as an increasing trend of a data point, may necessitate additional inspection prior to the next scheduled frequency. The actions taken (corrected, additional inspection, or Action Request (**AR**) for repair submitted) are recorded on the inspection form, the WIPP automated Maintenance Management tracking program (**CHAMPS**) work order sheet, or the equipment logbook, whichever is applicable.

Items that are operational with restrictions are tagged with those restrictions. Items that are not operational are tagged and locked to prevent their use. Tagged and locked items are listed on the Tagout/Lockout Index. Once a scheduled repair or replacement is accomplished in accordance with the work authorization procedures, the tag or lock is removed from the item in accordance with the equipment tagout/lockout procedures. Normally, the individual inspecting the equipment/system is not qualified to make repairs and consequently, prepares an AR if repairs are needed. The AR is tracked by the CHAMPS system through the work control process. When parts are received and work instructions are completed, the work order can be scheduled on the Plan of the Day (**POD**). The POD is held daily to ensure facility configuration can support scheduled work items and to allocate and coordinate the resources necessary to complete the items.

Work orders are released for work by the responsible organization. When repairs are complete the responsible organization tests the equipment to ensure the repairs corrected the problem, then closes out the work order, to return the equipment to an operational status for normal operations to resume. Implementation of these procedures constitutes compliance with 20.4.1.500 NMAC (incorporating 40 CFR §264.15(c)).

Requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.15(d)), are met by the inspections for each item or system included in Tables D-1 and D-1a. The results of the inspections are maintained in the operating record for at least three years. The inspection logs or summary records include the date and time of inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions. Major pieces of waste handling equipment are inspected using proceduralized inspections. Current copies of inspection forms are maintained in the Operating Record. Non-administrative changes (i.e., changes that affect the frequency or content of inspections) to inspection forms must be submitted to the NMED in accordance with the appropriate portions of 20 NMAC 4.1.900 (incorporating 40 CFR §270.42). The status of these pieces of equipment is maintained in an equipment logbook that is separate from the checklist. The logbook contains information regarding the condition of the equipment. Equipment operators are required, by the inspection checklist, to consult the logbook as the first activity in the inspection procedure. This logbook is maintained in the operating record. CH transuranic (**TRU**) mixed waste equipment ~~Equipment~~ that is controlled by a logbook includes the waste handling fork lifts, all waste handling cranes, the adjustable center of gravity lift fixture, the CH TRU ~~transuranic (**TRU**)~~

underground transporter, the facility transfer vehicle, the trailer jockey, and the push-pull attachment. RH TRU mixed waste equipment that is controlled by a logbook includes the 140/25-ton RH Bay overhead bridge crane, cask transfer cars, 25-ton cask unloading room crane, transfer cell shuttle car, RH Bay cask lifting yoke, facility grapple, 6.2- ton overhead hoist, facility cask rotating device, hot cell overhead powered manipulator, 15-ton hot cell crane, facility cask transfer car, 41-ton forklift, facility cask, and horizontal emplacement and retrieval equipment. Inspections of the Cask Unloading Room, Hot Cell, Transfer Cell, Facility Cask Loading Room, RH Bay and radiation monitoring equipment will be recorded on data sheets. In addition to the inspections listed in Tables D-1 and D-1a, many pieces of equipment are subject to regular preventive maintenance. This includes more in-depth inspections of mechanical systems, load testing of lifting systems, calibration of measurement equipment and other actions as recommended by the equipment manufacturer or as required by DOE Orders. These preventive maintenance activities along with the inspections in Tables D-1 and D-1a make mechanical failure of waste handling equipment unlikely. The WIPP Safety Analysis Report (DOE, 1999 ~~1995a~~) and the WIPP Remote-Handled Waste Preliminary Safety Analysis Report (RH PSAR) (DOE, 2000) contain~~s~~ the results of a systematic analysis of waste handling equipment and the hazards associated with potential mechanical failures. Equipment subject to failures that cannot practically be mitigated is retained for analysis and ~~are~~ is the basis for contingency planning. The inspection procedures maintained in the Operating Record for operational and preventive maintenance are implemented to assure the equipment is maintained. An example equipment inspection checklist and a typical logbook form are shown as Figures D-1 and D-~~1~~2. Actual checklists or forms are maintained within the Operating Record.

D-1a General Inspection Requirements

Tables D-1, D-1a, and D-2 of this Permit Attachment list the major categories of monitoring equipment, safety and emergency systems, security devices, and operating and structural equipment that are important to the prevention or detection of, or the response to, environmental or human health hazards caused by hazardous waste. These systems may include numerous subsystems. These systems are inspected according to the frequency listed in Tables D-1 and D-1a, a copy of which is maintained at the WIPP facility. The frequency of inspections is based on the nature of the equipment or the hazard and regulatory requirements. When in use, daily inspections are made of areas subject to spills, such as TRU mixed waste loading and unloading areas in the WHB Unit, looking for deterioration in structures, mechanical items, floor coatings, equipment, malfunctions, etc., in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.15(b)(4)).

As required in 20.4.1.500 NMAC (incorporating 40 CFR §264.33), the WIPP facility inspection procedures for communication and alarm systems, fire-protection equipment, and spill control and decontamination equipment include provisions for testing and maintenance to ensure that the equipment will be operable in an emergency.

D-1a(1) Types of Problems

The inspections for the systems, equipment, structures, etc., listed in Tables D-1 and D-1a, include the types of problems (e.g., malfunctions, cracks in coatings or welds, and deterioration) to be looked for during the inspection of each item or system, if applicable, and are in compliance with 20.4.1.500 NMAC (incorporating 40 CFR §264.15(b)(3)).

D-1a(2) Frequency of Inspections

Tables D-1, D-1a, and D-2 of this Permit Attachment list the inspection frequencies and monitoring schedule for equipment and systems subject to the 20.4.1 NMAC hazardous waste management requirements. The frequency is based on the rate of possible deterioration of the equipment and the probability of an environmental or human health incident if the deterioration or malfunction, or any operator error, goes undetected between inspections. Areas subject to spills, such as loading and unloading areas, are inspected daily when in use, consistent with the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.15(b)(4)).

When ~~a~~ RH TRU mixed waste ~~container~~ is present in the RH Complex, inspections are conducted visually and/or using a closed-circuit video camera in order to manage worker dose and to minimize occupational radiation exposures to as low as reasonably achievable (**ALARA**). More extensive inspections of these areas are performed at least annually during routine maintenance periods and when RH TRU mixed waste is not present.

D-1a(3) Monitoring Systems

There are two monitoring systems used at the WIPP to provide assurance that facility systems are operating correctly, that areas can be used safely, and that there have been no releases of hazardous waste constituents. These systems are shown in Table D-2 and include the geomechanical monitoring system and the central monitoring system (**CMS**). The geomechanical monitoring system is used to assess the condition of mined excavations to assure no unsafe conditions are allowed to develop. The CMS continuously assesses the status of the fixed radiation monitoring equipment, electrical power, fire alarm systems, ventilation system, and other facility systems including water tank levels. In addition, the CMS collects data from the meteorological monitoring system.

D-1b Specific Process Inspection Requirements

20.4.1.500 NMAC (incorporating 40 CFR §264.15(b)(4)), requires inspections of specific portions of a facility, rather than the general facility. These include container storage areas and miscellaneous units. Both are addressed below.

D-1b(1) Container Inspection

Containers are used to manage TRU mixed waste at the WIPP facility. These containers are described in Permit Module III. Off-site CH TRU mixed waste will arrive in 55-gallon drums arranged as seven (7)-packs, in Ten Drum Overpacks (**TDOP**), in 85-gallon drums arranged as four (4) packs, in 100-gallon drums arranged as three (3) packs, or in standard waste boxes (**SWB**). The waste containers will be visually inspected to ensure that the waste containers are in good condition and that there are no signs that a release has occurred. This visual inspection shall not include the center drums of 7-packs and waste containers positioned such that visual observation is precluded due to the arrangement of waste assemblies on the facility pallets. If CH TRU mixed waste handling operations should stop for any reason with containers located on the TRUPACT-II Unloading Dock (**TRUDOCK** storage area of the WHB Unit) in the Contact-Handled Packages, primary waste container inspections could not be accomplished until the containers of waste are removed from the shipping containers.

RH TRU mixed waste will arrive in containers inside Nuclear Regulatory Commission (**NRC**)-certified casks designed to provide shielding and facilitate safe handling. Canisters, will be loaded singly into an RH-TRU 72-B cask. Drums will be loaded into a CNS 10-160B cask. The cask will be visually inspected upon arrival. Because RH TRU mixed waste is ~~held in the Parking Area Staging Area or~~ stored in the Parking Area Unit in sealed casks, there are no additional requirements for engineered secondary containment systems. Following removal of the canisters and drums, the interior of the cask will be inspected and surveyed for evidence of contamination that may have occurred during transport.

RH TRU mixed waste is handled and stored in the RH Complex of the WHB. The RH Complex includes the following: RH Bay, the Cask Unloading Room, the Hot Cell, the Transfer Cell, and the Facility Cask Loading Room. As RH TRU mixed waste is held in canisters within a canister rack the physical inspection of the drum or canister is not possible. Inspections of RH TRU mixed waste in these areas occurs remotely via closed-circuit camera a minimum of once weekly when stored waste is present. Because RH TRU mixed waste is ~~held in the Parking Area Holding Area or stored in the Parking Area Unit~~ in sealed casks, there are no additional requirements for engineered secondary containment systems. ~~There are no additional requirements for engineered secondary containment systems.~~ However, the floors in the RH Complex (including the RH Bay, Facility Cask Loading Room and Cask Unloading Room) are coated concrete and during normal operations (i.e., when waste is present), the floor of the RH Complex is inspected visually or by using close-circuit cameras on a weekly basis to verify that it is in good condition and free of obvious cracks and gaps.

Inspections of RH TRU mixed waste containers stored in the Hot Cell and Transfer Cell are conducted using remotely operated cameras. RH TRU mixed waste in the Hot Cell is stored in either drums or canisters. The containers in the Hot Cell are inspected to ensure that they are in acceptable condition. RH TRU mixed waste in the Transfer Cell is stored in the RH-TRU 72-B cask or shielded insert; therefore, inspections in this area focus on the integrity of the cask or shielded insert~~;~~. RH TRU mixed waste in the Facility Cask Loading Room is stored in the facility cask; therefore, inspections in this area focus on the integrity of the facility cask.

Inspections will be conducted in the Parking Area Unit at a frequency not less than once weekly when waste is present. These inspections are applicable to loaded~~, and stored~~ Contact-Handled and Remote-Handled Packages. The perimeter fence located at the lateral limit of the Parking Area Unit, coupled with personnel access restrictions into the WHB Unit, will provide the needed security. The perimeter fence and the southern border of the WHB shall mark the lateral limit of the Parking Area Unit. Radiologically controlled areas can be established temporarily with barricades. More permanent structures can be installed. The western boundary can be established with temporary barricades since this area is within the perimeter fence. Access to radiologically controlled areas will only be permitted to personnel who have completed General Employee Radiological Training (**GERT**), a program defined by the Permittees, or escorted by personnel who have completed GERT. This program ensures that personnel have adequate knowledge to understand radiological posting they may encounter at the WIPP site. The fence of the Radiologically Controlled Area, south from the WHB airlocks, was moved to provide more maneuvering space for the trucks delivering waste. Since TRU mixed waste to be stored in the Parking Area Unit will be in sealed Contact-Handled or Remote-Handled Packages, there will be no additional requirements for engineered secondary containment systems. Inspections of the Contact-Handles and Remote-Handled Packages stored in the Parking Area Unit shall be conducted at a frequency no less than once weekly and will focus on the inventory and integrity of the shipping containers and the spacing between trailers carrying the Contact-Handled or Remote-Handled Packages. This spacing will be maintained at a minimum of four feet.

Container inspections will be included as part of the surface TRU mixed waste handling areas (i.e. Parking Area Unit and WHB Unit) inspections described in Tables D-1 and D-1a. These inspections will also include the Derived Waste Storage Areas of the WHB Unit. The Derived Waste Storage Areas will consist of containers of 55 or 85-gallon drums or SWBs for CH TRU mixed waste and 55-gallon drums for RH TRU mixed waste. ~~The total storage volume of this area is up to 66.3 cubic feet (1.88 cubic meters).~~ A Satellite accumulation area (**SAA**) may be required in an area adjacent to the TRUDOCKs for CH TRU mixed waste. A SAA may also be required in the RH Bay and Hot Cell for RH TRU mixed waste. These ~~This~~ SAAs will be set up on an as needed basis at or near the point of generation and the derived waste will be discarded into the active derived waste container. All SAAs will be inspected in accordance with 20.4.1.300 NMAC (incorporating 40 CFR §262.34).

D-1b(2) Miscellaneous Unit Inspection

20.4.1.500 NMAC (incorporating 40 CFR §264.602), requires that inspections required in 20.4.1.500 NMAC (incorporating 40 CFR §264.15 and §264.33), as well as any additional requirements needed to protect human health and the environment, be met. The requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.15 and §264.33) are discussed in Section D-1 of this Permit Attachment, along with how the WIPP facility complies with those requirements for standard types of inspections. Inspection frequencies for geomechanical monitoring equipment are provided in Table D-1. The monitoring schedule for geomechanical instrumentation is given in Table D-2.

References

DOE, ~~1997~~ 1999. "WIPP Safety Analysis Report," DOE/WIPP-95-2065. Rev. ~~2~~ 4, U.S. Department of Energy. Washington, D.C.~~, March 1997.~~

DOE, 2000. “WIPP Remote-Handled Waste Preliminary Safety Analysis” (RH PSAR), U.S. Department of Energy. Washington, D.C.

FIGURES

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TYPICAL EQUIPMENT
WEEKLY CHECK LIST

_%_ OK **_X_ Adjustment Made** **_O_ Repairs Required**

AR Written [ ] Yes [ ] No AR # ______________

(check or complete appropriate information)

ITEM INSPECTED	Condition	Comments/Corrective Action
Mechanical Checks: (examples)		
Oil level		
Radiator fluid level		
Automatic transmission fluid level		
Operate all valves/check gauges		
Emergency brake		
Fuel level (> ¾ full)		
Oil pressure (at warm idle)		
Tire Pressure		
Sirens, horn, & back-up alarm		
Deterioration Checks: (examples)		
Fan belts		
Battery (terminals, cables)		
Run generator 5 min.		
Hose, nozzles & valves		
Leaks/Spills Checks: (examples)		
Leaks around pump		
Foam tank level		
Required Equipment: (examples)		
Inspect SCBAs (> 4050 psi)		
Hand tools & equipment		
Trauma Kit		

Inspected by: ____
Print Name Signature Time/Date

Inspected by: ____
Print Name Signature Time/Date

Reviewed by: ____
Print Name Signature Time/Date

Comments: ____
____
____

NOTE: All items that are mandatory for every inspection form are shown in bold.

Figure D-1
Typical Inspection Checklist

HOUR METER READING _______________ EQUIPMENT NO. _______________

DEFICIENCIES NOTED: ____

____

____

____

____

PRE OPS COMPLETED PER __{Procedure Number}__ SAT ______ **PROBLEMS NOTED** _____

CORRECTIVE ACTIONS TAKEN: ____

____

____

____

____

____

____

OPERATOR SIGNATURE	**DATE**	**TIME**	**SUPERVISOR SIGNATURE/DATE**
____________________	_________	_________	________________________

NOTE: All items that are mandatory for every inspection form are shown in bold.

Figure D-2
Typical Logbook Entry

TABLES

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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
Air Intake Shaft Hoist	Underground Operations	Preoperational [c] See Lists 1b and c	WP 04-HO1004 Inspecting for Deterioration[b], Safety Equipment, Communication Systems, and Mechanical Operability[m] in accordance with Mine Safety and Health Administration (MSHA) requirements
Ambulances (Surface and Underground) and related emergency supplies and equipment	Emergency Services	Weekly See List 11	PM000030 Inspecting for Mechanical Operability[m], Deterioration[b], and Required Equipment[n]
Adjustable Center of Gravity Lift Fixture	Waste Handling	Preoperational See List 8	WP 05-WH1410 Inspecting for Mechanical Operability[m] and Deterioration[b]
Backup Power Supply Diesel Generators	Facility Operations	Monthly See List 3	WP 04-ED1301 Inspecting for Mechanical Operability[m] and Leaks/Spills by starting and operating both generators. Results of this inspection are logged in accordance with WP 04-AD3008.
Facility Inspections (Water Diversion Berms)	Facility Engineering	Annually See List 4	WP 10-WC3008 Inspecting for Damage, Impediments to water flow, and Deterioration[b]
Central Monitoring Systems (CMS)	Facility Operations	Continuous See List 3	Automatic Self-Checking
Contact-Handled (CH) TRU Underground Transporter	Waste Handling	Preoperational See List 8	WP 05-WH1603 Inspecting for Mechanical Operability[m], Deterioration[b], and area around transporter clear of obstacles
Facility Transfer Vehicle	Waste Handling	Preoperational See List 8	WP 05-WH1406 Inspecting for Mechanical Operability[m], Deterioration[b], path clear of obstacles, and guards in the proper place
Exhaust Shaft	Underground Operations	Quarterly See List 1a	PM041099 Inspecting for Deterioration[b] and Leaks/Spills
Eye Wash and Shower Equipment	Equipment Custodian	Weekly See List 5	WP 12-IS1832 Inspecting for Deterioration[b]
		Semi-annually See List 2a	WP 12-IS1832 Inspecting for Deterioration[b] and Fluid Levels–Replace as Required
Fire Detection and Alarm System	Emergency Services	Semiannually See List 11	PM000027 Inspecting for Deterioration[b], Operability of indicator lights and, underground fuel station dry chemical suppression system. Inspection is per NFPA 72

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
Fire Extinguishers[j]	Emergency Services	Monthly See List 11	PM000036 Inspecting for Deterioration[b], Leaks/Spills, Expiration, seals, fullness, and pressure
Fire Hoses	Emergency Services	Annually (minimum) See List 11	PM000031 Inspecting for Deterioration[b] and Leaks/Spills
Fire Hydrants	Emergency Services	Semi-annual/ annually See List 11	PM000034 Inspecting for Deterioration[b] and Leaks/Spills
Fire Pumps	Emergency Services	Weekly/annually See List 11	PM000026 Inspecting for Deterioration[b], Leaks/Spills, valves, and panel lights
Fire Sprinkler Systems	Emergency Services	Monthly/ quarterly See List 11	PM000025 Inspecting for Deterioration[b], Leaks/Spills, static pressures, and removable strainers
Fire Trucks (Seagrave Fire Apparatus, Emergency One Apparatus, Brush Truck, and Underground Rescue Truck)	Emergency Services	Weekly See List 11	PM000033 Inspecting for Mechanical Operability[m], Deterioration[b], Leaks/Spills, and Required Equipment[n]
Forklifts Used for Waste Handling (Electric and Diesel forklifts, Push-Pull Attachment)	Waste Handling	Preoperational See List 8	WP 05-WH1401, WP 05-WH1402, WP 05-WH1403, and WP 05-WH1412 Inspecting for Mechanical Operability[m], Deterioration[b], and On board fire suppression system
Hazardous Material Response Equipment	Emergency Services	Weekly See List 11	PM000033 Inspecting for Mechanical Operability[m], Deterioration[b], and Required Equipment[n]
Miners First Aid Station	Emergency Services	Quarterly See List 11	PM000035 Inspecting for Required Equipment[n]
Mine Pager Phones (between surface and underground)	Facility Operations	Monthly See List 3	WP 04-PC3017 Testing of PA and Underground Alarms and Mine Page Phones at essential locations
MSHA Air Quality Monitor	Maintenance/ Underground Operations	Daily[l] See Lists 1 and 10	WP 12-IH1828 Inspecting for Air Quality Monitoring Equipment Functional Check
Perimeter Fence, Gates, Signs	Security	Daily See List 6	PF0-011 Inspecting for Deterioration[b] and Posted Warnings

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
Personal Protective Equipment (not otherwise contained in emergency vehicles or issued to individuals): —Self-Contained Breathing Apparatus	Emergency Services	Weekly See List 11	PM000029 Inspecting for Deterioration[b] and Pressure
Public Address (and Intercom System)	Facility Operations	Monthly See List 3	WP 04-PC3017 Testing of PA and Underground Alarms and Mine Page Phones at essential locations Systems operated in test mode
Radio Equipment	Facility Operations	Daily[i] See List 3	Radios are operated daily and are repaired upon failure
Rescue Truck (Surface and Underground)	Emergency Services	Weekly See List 11	PM000030 and PM000033 Inspecting for Mechanical Operability[m], Deterioration[b], Leaks/Spills, and Required Equipment[n]
Salt Handling Shaft Hoist	Underground Operations	Preoperational See List 1b and c	WP 04-HO1002 Inspecting for Deterioration[b], Safety Equipment, Communication Systems, and Mechanical Operability[m] in accordance with MSHA requirements
Self-Rescuers	Underground Operations	Quarterly See List 1c	WP 04-AU1026 Inspecting for Deterioration[b] and Functionality in accordance with MSHA requirements
Surface TRU Mixed Waste Handling Area [k]	Waste Handling	Preoperational or Weekly [e] See List 8	WP 05-WH1101 Inspecting for Deterioration[b], Leaks/Spills, Required Aisle Space, Posted Warnings, Communication Systems, Container Condition, and Floor coating integrity
TRU Mixed Waste Decontamination Equipment	Waste Handling	Annually See List 8	WP 05-WH1101 Inspecting for Required Equipment[n]
Underground Openings—Roof Bolts and Travelways	Underground Operations	Weekly See List 1a	WP 04-AU1007 Inspecting for Deterioration[b]
Underground—Geomechanical Instrumentation System (GIS)	Geotechnical Engineering	Monthly See List 9	WP 07-EU1301 Inspecting for Deterioration[b]
Underground TRU Mixed Waste Disposal Area	Waste Handling	Preoperational See List 8	WP 05-WH1810 Inspecting for Deterioration[b], Leaks/Spills, mine pager phones, equipment, unobstructed access, signs, debris, and ventilation

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
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.
TDOP Upender	Waste Handling	Preoperational See List 8	WP 05-WH1010 Inspecting for Mechanical Operability[m] and Deterioration[b]
Vehicle Siren	Emergency Services	Weekly See List 11	Functional Test included with inspection of the Ambulances, Fire Trucks, and Rescue Trucks
Ventilation Exhaust	Maintenance Operations	Quarterly See List 10	IC041098 Check for Deterioration[b] and Calibration of Mine Ventilation Rate Monitoring Equipment
Waste Handling Cranes	Waste Handling	Preoperational See List 8	WP 05-WH1407 Inspecting for Mechanical Operability[m], Deterioration[b], and Leaks/Spills
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
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.
Push-Pull Attachment	Waste Handling	Preoperational See List 8	WP 05-WH1401 Inspecting for Damage and Deterioration[b]
Trailer Jockey	Waste Handling	Preoperational See List 8	WP 05-WH1405 Inspecting for Mechanical Operability[m] and Deterioration[b]
Facility Grapple	Waste Handling	Preoperational See List 8	To Be Determined (RH equipment)
15-Ton Bridge Crane	Waste Handling	Preoperational See List 8	To Be Determined (RH equipment)
Hook and Rope on 50/25-Ton Bridge Crane	Waste Handling	Preoperational See List 8	To Be Determined (RH equipment)

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

List 1: Underground Operations

a. Mining Technician *
Senior Mining Technician *
Continuous Mining Specialist *
Senior Mining Specialist *
Mine OPS Supervisor *

b. Waste Hoist Operator
Waste Hoist Shaft Tender

c. U/G Facility Operations* - Self Rescuers
Shaft Technician *

d. Operations Engineer
Supervisor U/G Services*
Senior Operations Engineer*

List 2: Industrial Safety

a. Safety Technician *
Senior Safety Technician *
Safety Specialist *
Safety Engineer *
Industrial Hygienist *

b. Fire Protection Engineering *

List 3: Facility Operations

Facilities Technician *
Senior Facilities Technician *
Facility Operations Specialist *
Central Monitoring Room Operator *
Central Monitoring Room Specialist *
Operations Engineer
Senior Operations Engineer *
Facility Shift Manager
Operations Technical Coordinator *

List 4: Facility Engineering

Senior Engineer *

List 5: General

Equipment Custodian*

List 6: Security

Security Protective *
Security Protective Supervisor *

List 8: Waste Handling

Manager, Waste Operations
TRU-Waste Handler

List 9: Geotechnical Engineering

Engineer Technician *
Associate Engineer *
Engineer *
Senior Engineer *
Principal Engineer*

List 10: Maintenance Operations

Maintenance Technician *
Maintenance Specialist *
Senior Maintenance Specialist *
Contractor *

List 11: Emergency Services

Qualified Emergency Services Personnel
Fire Protection Technician

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 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 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).

TABLE D-1A
RH TRU MIXED WASTE INSPECTION SCHEDULE/PROCEDURES

System/ Equipment Name	Responsible Organization	Inspection[a] Frequency and Job Title of Personnel Normally Making Inspection	Procedure Number (Latest Revision)	Inspection Criteria		
				Deterioration[b]	Leaks/ Spills	Other
Cask Transfer Car(s)	Waste Operations	Preoperational[c,d,e] See list 1	WP05-WH1701 PM041186 (Semi-Annual)	Yes	NA	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication
RH Bay Overhead Bridge Crane	Waste Operations	Preoperational[c,d,e] See list 1	WP05-WH1741 PM041232 (Quarterly & Annual) PM041117 (Annual)	Yes	Yes	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication
Facility Cask	Waste Operations	Preoperational[c,d,e,f] See list 1	WP05-WH1753 PM041201 (Annual) PM041203 (Annual)	Yes	NA	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication. Electrical PM.
RH Bay Cask Lifting Yoke	Waste Operations	Preoperational[c,d,e] See list 1	WP05-WH1741 PM041233 (Annual)	Yes	NA	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication
Facility Cask Transfer Car	Waste Operations	Preoperational[c,d,e,f] See list 1	WP05-WH1704 PM041186 (Quarterly) PM041195 (Annual)	Yes	Yes	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication Electrical Inspection
Facility Cask Rotating Device	Waste Operations	Preoperational[c,d,e,f] See list 1	WP05-WH1713 PM041175 (Annual) PM041176 (Annual)	Yes	Yes	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication Electrical Inspection
Facility Grapple	Waste Operations	Preoperational[c,d,e,f] See list 1	WP05-WH1721 PM041172 (Quarterly) PM041177 (Annual)	Yes	NA	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear. Non-Destructive Examination
6.25-Ton Hoist	Waste Operations	Preoperational[c,d,e,f] See list 1	WP05-WH1721 PM041173 (Annual)	Yes	Yes	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication
Transfer Cell Shuttle Car	Waste Operations	Preoperational[c,d,e,f] See list 1	WP05-WH1705 PM041184 (Semi-Annual) PM041222 (Annual)	Yes	Yes	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication. Electrical Inspection.
Cask Unloading Room	Waste Operations	Preoperational[c,d,e,f,h] See list 1	WP05-WH1744	Yes	NA	Floor coating integrity
Hot Cell	Waste Operations	Preoperational[c,d,e,f,g,h] See list 1	WP05-WH1744	Yes	NA	Floor coating integrity

TABLE D-1A
RH TRU MIXED WASTE INSPECTION SCHEDULE/PROCEDURES

System/ Equipment Name	Responsible Organization	Inspection[a] Frequency and Job Title of Personnel Normally Making Inspection	Procedure Number (Latest Revision)	Inspection Criteria		
				Deterioration[b]	Leaks/ Spills	Other
Hot Cell Overhead Po wered Manipulator	Waste Operations	Preoperational[c,d,e] See list 1	WP05-WH1743 PM041215 (Annual) PM041216 (Annual) IC411037 (Annual)	Yes	Yes	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication. Electrical Inspection. Load Cell Calibration
Hot Cell Bridge Crane	Waste Operations	Preoperational[c,d,e] See list 1	WP05-WH1742 PM041217 (Annual) PM041209 (Annual) IC411038 (Annual)	Yes	Yes	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication. Electrical Inspection. Load Cell Calibration.
Transfer Cell	Waste Operations	Preoperational[c,d,e,f,h] See list 1	WP05-WH1744	Yes	NA	Floor coating integrity
Facility Cask Loading Room	Waste Operations	Preoperational[c,d,e,f,h] See list 1	WP05-WH1744	Yes	NA	Floor coating integrity
Closed Circuit Television Camera	Waste Operations	Preoperational[c] See list 1	WP05-WH1757	NA	NA	Operability
Radiation Monitoring Equipment	Radiation Safety	Preoperational[c,d,e] See list 2	WP12–HP1302 PM411015 IC411039 & IC411040 IC411036 (Annual)	Yes	NA	Operability Checks, Functional Checks, Instrument calibrations, Flow Calibration, Efficiency Checks.
Cask Unloading Room Crane	Waste Operations	Preoperational[c,d,e] See list 1	WP05-WH1719 PM041190 (Quarterly & Annual) PM041191 (Annual) PM041192 (Annual) IC411035 (Annual)	Yes	Yes	Pre-operational Checks and Operating Instructions. Mechanical Inspection for Wear and Lubrication. Electrical Inspection. Load Cell Calibration.
Horizontal Emplacement and Retrieval Equipment	Waste Operations	Preoperational[c,d,e,f] See list 1	WP05-WH1700 PM052010 (Monthly) PM052011 (Annual) PM052013 PM052012 PM052014 (Annual)	Yes	Yes	Assembly and Operating Instructions. Electrical Inspection. Position Transducer Calibration. Tilt Sensor Calibration.

TABLE D-1A
RH TRU MIXED WASTE INSPECTION SCHEDULE/PROCEDURES

System/ Equipment Name	Responsible Organization	Inspection[a] Frequency and Job Title of Personnel Normally Making Inspection	Procedure Number (Latest Revision)	Inspection Criteria		
				Deterioration[b]	Leaks/ Spills	Other
41-Ton Forklift	Waste Operations	Preoperational[c,d,e] See list 1	WP05-WH1602 PM074061 PM052003 (Hours of Use) PM074027 (Quarterly) PM074029 &PM074051 (Annual)	Yes	Yes	Pre-Operational Checks. PM performed every 100 hours of operation, every 500 hours of operation or every 5 Years. Quarterly Engine Emission Test. Annual Electrical Inspection. Annual NDE.
RH Bay	Waste Operations	Preoperational[c,d,e,h] See list 1	WP05-WH1744	Yes	NA	Floor coating integrity
Surface RH TRU Mixed Waste Handling Area	Waste Operations	Preoperational See List 1	WP- 05 WH1744	Yes	Yes	Posted Warning, Communications

TABLE D-1A (CONTINUED)
RH TRU MIXED WASTE INSPECTION SCHEDULE/PROCEDURES LISTS

List 1: Waste Operations

Manager, RH Waste Handling
Qualified TRU-Waste Handler, Level II or III

List 2: Radiation Safety

Radiological Control Technician

TABLE D-1A (CONTINUED)
RH TRU MIXED WASTE 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 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 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 waste handling evolution. (The evolution is considered to be from the receipt of a cask into the RH Bay through canister emplacement in the underground.) For an area, preoperational inspection 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 functional components and emergency equipment are present and operational. When the equipment is not in use, no inspections are required.

[d] When equipment needs to be inspected while handling waste (i.e., during waste unloading or transfer operations), general cleanliness and functional components will be inspected to detect any problem that may harm human health or the environment. The inspection will verify that emergency equipment is present.

[e] Inspection of RH TRU mixed waste equipment and areas in the RH Complex applies only after RH TRU mixed waste receipt begins.

[f] The inspection/maintenance activities associated with these pieces of equipment are performed when the RH Complex is empty of RH TRU mixed waste. If contamination is present, a radiation work permit may be needed.

[g] For the Hot Cell and Transfer Cell, if RH TRU mixed waste is present, camera inspections will be performed in lieu of physical inspection.

[h] The integrity of the floor coating will be inspected weekly if RH TRU mixed waste is present.

TABLE D-2
MONITORING SCHEDULE

System/Equipment Name	Responsible Organization	Monitoring Frequency	Purpose
Geomechanical [b]	Geotechnical Engineering	Monthly	To evaluate the geotechnical performance of the underground facility and to detect ground conditions that could affect operational safety
Central Monitoring System	Facility Operations	System Dependent	Monitor and provide status for the following facility parameters: Electrical Power Status [d] Fire Alarm System [e] Ventilation System Status [f] Meteorological Data System [g] Facility Systems (compressors [g], pumps [h], water tank levels [i], waste hoists [j])

[b] Equipment is listed as Underground-Geomechanical Instrumentation System (GIS) in Table D-1.
[d] Equipment listed as Backup Power Supply Diesel Generator in Table D-1.
[e] Equipment listed as Fire Detection and Alarm System in Table D-1.
[f] Equipment listed as Ventilation Exhaust in Table D-1.
[g] Not RCRA equipment.
[h] Equipment listed as Fire Pumps in Table D-1.
[i] Equipment listed as Water Tank Level in Table D-1.
[j] Equipment listed as Waste Hoist in Table D-1.

ATTACHMENT E

PREPAREDNESS AND PREVENTION

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ATTACHMENT E

PREPAREDNESS AND PREVENTION

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ATTACHMENT E

PREPAREDNESS AND PREVENTION

E-1 Preparedness and Prevention Requirements

Preparedness and Prevention Requirements are as described in the following sections.

E-1a Equipment Requirements

The WIPP facility is well equipped with internal and external communications systems, emergency equipment, and water for fire control. As shown in the following sections, the Permittees fully commit to meeting the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.32 and §264.34).

E-1a(1) Internal Communications

20.4.1.500 NMAC (incorporating 40 CFR §264.32(a)), requires a facility to have an internal communications or alarm system capable of providing immediate emergency instructions (voice or signal) to facility personnel. In addition, 20.4.1.500 NMAC (incorporating 40 CFR §264.34(a)), requires that employees have immediate access to an internal alarm or emergency communication device when handling transuranic (**TRU**) mixed waste. The following discussions show that the WIPP facility is well equipped for internal communications and that the Permittees fully commit to complying with the regulations.

The intraplant communication systems, designed to provide immediate emergency instructions to facility personnel, include two-way communication by the public address (**PA**) system and its intercom phones and paging channels, an intraplant telephone system, mine phones, pagers and plectrons, portable two-way radios, and local and facility wide alarm systems. The procedures for notifying facility personnel in an emergency are contained in the Contingency Plan, Permit Attachment F of this Permit.

The intercom system (with an integral PA system) consists of handset stations and loudspeaker assemblies, with multiple amplifiers. The system has multiple channels in the main buildings. Initial communication between parties within the plant can be established by using the paging channel. Each designated location has a single set of electrically isolated speakers and a handset. In order to cover most areas in the plant, loudspeakers are properly oriented, and volume levels are adjusted. If one station fails, the remaining stations are isolated from the out-of-service unit to prevent a failure in the remaining system.

Private branch automatic exchange two-way communication is provided between any two telephones located above or below ground. Direct dialing to outside telephones and direct dialing to WIPP facility telephones are provided by this system. Failure of a single telephone station does not affect the balance of the telephone system. If the telephone system should fail, the PA system, the plectrons, and the portable two-way radios provide backup surface communications.

The Site Notification System (**SNS**) consists of pagers in the possession of office wardens and plectrons located in various buildings. The SNS pagers and plectrons are tone-activated radio receivers that are activated by the two-way radio system. To generate a tone on the pagers and plectrons or to send a verbal message, the radio operator enters a security code into the two-way radio system and begins broadcasting. The SNS pagers are portable and battery-operated. The plectrons are portable and can be plugged into a standard electrical circuit or powered from internal batteries that are continuously recharged when connected to the electrical circuit.

A plant radio station in the Guard and Security Building, one located in the Emergency Operations Center in the Safety and Emergency Services Building, and one in the Central Monitoring Room (**CMR**), allow two-way radio communication with on-site personnel and with mobile/portable WIPP facility radios operating on and off the WIPP site. The two-way radio also allows one-way emergency notification on the portable SNS pagers and plectrons. The two-way radio system located in the CMR is supplied with power from the uninterruptible power supply if the off-site power supply fails.

There are various alarm systems used at the WIPP facility. The PA system has two alarm tones in use, a yelp and a gong. Its signals are produced in the master PA console by a tone generator and are transmitted sitewide over the paging channel of the system, overriding its normal use. The signals are intermittent and of high intensity. The evacuation tone is a yelp tone and is used for, and limited to, situations requiring immediate, rapid, and complete (or selective area) evacuation. The evacuation tone is initiated manually on the surface. In the underground, the evacuation tone may be initiated manually or automatically by underground fire detection and alarm systems. This tone is also a yelp tone. It is accompanied with strobe lights for high noise areas. These alarm signals take priority over other signals on the paging channel but do not affect the intercom channels. Evacuation alarms using the PA system, local and plantwide, also can be initiated manually from the CMR in the Support Building. The audible alarm signals are supplemented by warning lights in high ambient-noise areas underground, such as active mining areas. These alarms are supplied with power from the uninterruptible power supply if the off-site power supply fails. The PA system may also produce a gong tone followed by a message. Local fire alarms are bell tones.

Whenever TRU mixed wastes are handled, two persons, at a minimum, are involved in the operation. The WHB contains readily accessible telephones and PA stations throughout. The mine phones are the main means of communication underground, although the PA system is also available.

Underground communication and alarm systems will be arranged to meet the requirements of 30 CFR Part 57. Telephones or other two-way communication equipment with instructions for their use will be provided for communications from underground to the surface. These communications are typically moved to ensure communications are maintained close to the work areas. Alarm systems capable of promptly warning every person underground, will be provided and maintained in operating condition. If persons are assigned to work areas beyond the warning capabilities of the system, provisions will be made to alert them in a proper manner to provide for their safe evacuation. Typically, these provisions include a flashing light capable of being seen easily. As part of the preoperational inspection, prior to initiating waste handling operations underground, waste handling personnel verify that underground communications are ready and are working. If they are not working, repairs are initiated.

Table F-6 in Permit Attachment F describes the capabilities and locations of the various internal communication systems.

E-1a(2) External Communications

20.4.1.500 NMAC (incorporating 40 CFR §264.32(b)), requires that a communications device be available for contacting outside agencies for emergency assistance. In addition, 20.4.1.500 NMAC (incorporating 40 CFR §264.34(b)), requires that if just one employee is on the premises, the employee must have immediate access to a device capable of summoning outside help. TRU mixed waste handling operations are not conducted at the WIPP facility when only one person is present on the premises. TRU mixed waste handling operations are conducted by two or more persons. The security officers and staff from Facility Operations are also present at the WIPP facility during TRU mixed waste handling operations. When no TRU mixed waste handling operations are being conducted at the WIPP facility, at a minimum, the security officers and staff from Facility Operations are present. As discussed below, the WIPP facility has the required external communication devices and will operate in a manner that fully complies with these regulations.

The external communication systems, designed to provide two-way communication with outside agencies or for summoning emergency assistance from off site, include the commercial telephone system and two-way radios.

Direct dialing through any telephone located above or below ground allows contact with outside agencies. Failure of a single telephone station does not affect the balance of the telephone system. Sixty percent of the direct-dial incoming and outgoing lines are routed via a microwave system located on the edge of the parking lot. The remaining 40 percent of the direct-dial lines are routed to Carlsbad by means of a buried cable. In the unlikely event that both routing modes are inoperable, direct dial telephone capability still exists via cellular telephone or Satellite Communications (**SATCOM**) linkage in the Emergency Operations Center.

Plant radio stations in the Guard and Security Building and in the Emergency Operations Center in the Safety and Emergency Services Building allow two-way radio communication with the CMR, the Eddy County and Lea County Sheriff's Departments, the New Mexico State Police, and the Otis Fire Response Teams. Communication is available with the Lea County Sheriff's Department, the Hobbs Fire Department, the Carlsbad Medical Center, and the Columbia Regional Hospital via the Eddy County dispatcher. Another base station is in the CMR, however it is not normally used to communicate with offsite agencies. Radios are not inspected, instead, they are operated daily and repaired if they fail.

Table F-6 in Permit Attachment F describes the capabilities and locations of the various external communication systems.

E-1a(3) Emergency Equipment

Contingency Plan (Permit Attachment F) describes the capabilities and locations of the fire-suppression equipment and systems. Table F-7 lists the types of fire-suppression systems by structure. Figure F-5 displays the underground locations of emergency equipment. Figure F-6 shows the fire-water distribution system on the surface. Figure F-7 shows the underground fuel area fire protection system. The information contained in these tables and figures in Permit Attachment F demonstrates that the WIPP facility has the portable fire extinguishers, fire-control equipment (including special extinguishing equipment that use foam, inert gas, or dry chemicals), spill-control equipment, and decontamination equipment needed for compliance with the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.32(c)).

E-1a(4) Water for Fire Control

20.4.1.500 NMAC (incorporating 40 CFR §264.32(d)), requires that the WIPP facility be equipped with water at an adequate volume and pressure to supply water-hose streams, foam-producing equipment, automatic sprinklers, or water-spray systems. The following discussion on fire control systems at the WIPP facility demonstrates the Permittees commitment to comply with this requirement.

The primary function of the WIPP facility water system is to supply water for domestic use and fire protection. Water is furnished by the Double Eagle Water Company, owned by the City of Carlsbad. Wells located 30 miles (mi) (48.3 kilometers [km]) north of the WIPP facility are the source of the water. Water is supplied by gravity flow through a 24 inch (in.) (61 centimeter [cm]) diameter pipeline to a junction point about 13 mi (20.9 km) north of the site at U.S. Highway 62/180. This line is sized to provide 6,000 gallons (gal) (22,712 liters [L]) per minute for use by others, in addition to the peak flow rate required by the WIPP facility. Controls at the junction point give the WIPP facility priority over flows to all other users. A 10 in. (25 cm) diameter pipeline supplies water by gravity flow from the tie-in point to the WIPP facility.

At the WIPP facility, the water enters a pair of 180,000-gal (681,372-L) aboveground storage tanks located adjacent to the Pumphouse. These tanks are 32 ft (9.75 m) in diameter and are constructed of welded steel. The water level in each tank is monitored in the CMR. One tank stores water for use by the facility's fire-water system. The other tank stores water for use by the facility's domestic water system, and to reserve approximately 100,000 gal (378,540 L) of water for use by the fire-water system. Separate sets of pumps for the domestic water and fire-water systems are provided in the Pumphouse. During a fire, the fire-water pump is automatically started, and available domestic water is used first. Upon depletion of the domestic-water inventory, the domestic-water pumps are automatically shut off, and the dedicated fire-water reserve is available for fire-suppression use only. The primary fire-water pump is a 100-percent-capacity electric pump. A 100-percent-capacity diesel fire-water pump provides backup in case of a power failure or when maintenance is required on the electric pump. Each fire-water pump is rated at 1,500 gal (5,678 L) per minute at 125 pounds (lb) (56.7 kilograms [kg]) per square in.

The following buildings are connected to and protected by the wet-pipe sprinkler system: the Pumphouse, the Guard and Security Building, the Support Building, the WHB, the Exhaust Filter Building, the TRUPACT Maintenance Facility, the Engineering Building, the Safety and Emergency Services Building, the Training Building, and several other warehouse and maintenance buildings. The Pumphouse, the Support Building, the WHB, and several other warehouse and maintenance buildings also have fire hose connections. There is no firefighting water-supply system underground. Instead, the underground is equipped with fire extinguishers of various types and in various locations (including vehicles) and a fire truck with a 125 lb (56.7 kg) chemical extinguisher. The underground fuel station is equipped with an automatic, 1,000-lb

(453.5 kg) chemical extinguishing systems. Only dry chemical materials or water are used to fight fires involving TRU mixed waste.

E-1b Aisle Space Requirement

20.4.1.500 NMAC (incorporating 40 CFR §264.35), requires that a facility maintain sufficient aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to areas of the facility during an emergency (other than a permanent disposal stack). Aisle space for each regulated unit is specified below.

Waste Handling Building Container Storage Unit (**WHB Unit**) and Parking Area Container Storage Unit (**Parking Area Unit**)

During TRU mixed waste handling operations, sufficient room is maintained for unobstructed movement of personnel, fire-protection equipment, spill control equipment, or decontamination equipment to areas in the WHB Unit.

Waste containers will remain inside the Contact-Handled (**CH**) or Remote-Handled (**RH**) Packages in the Parking Area Unit until TRU mixed waste handlers are prepared to handle them. As shown in Figure M1-1 in Permit Attachment M1, there is ready access to all areas within the WHB Unit where hazardous wastes are handled. Waste containers are unloaded from the Contact-Handled Package in to the WHB Unit (see Figure M1-12 in Permit Attachment M1). The WHB Unit can handle the unloading of four ~~Contact Handled~~ CH Packages at one time. Single RH TRU mixed waste canisters are unloaded from the RH-TRU 72-B casks in the Transfer Cell of the WHB Unit where they are transferred to facility casks (see Figures M1-23 and M1-24 in Permit Attachment M1). RH TRU mixed waste drums in CNS 10-160B casks, which may contain up to 10 drums configured in two 5-drum baskets (see Figure M1-25 in Permit Attachment M1), are unloaded from the cask staged in the Cask Unloading Room into the Hot Cell.

At all times, written procedures ensure that loaded ~~Contact Handled~~ CH or RH Packages, facility pallets, containment pallets, and waste containers in the WHB Unit and Parking Area Unit are managed ~~in the WHB Unit~~ in a manner to prevent obstructing the movement of personnel, fire-protection equipment, spill-control equipment, and decontamination equipment.

For CH TRU mixed waste, an ~~An~~ aisle space of at least 44 in. (1.1 m) between loaded facility or containment pallets will be maintained in all CH waste storage areas of the WHB Unit, and a minimum of 4 ft (1.2 m) of aisle space will be maintained between ~~Contact Handled~~ CH Packages in the outdoor Parking Area Unit. For RH TRU mixed waste, a minimum of 44 in. (1.1 m) between loaded casks in the RH Bay will be maintained. A maximum of two loaded casks may be stored in the RH Bay at one time. Implementation of written procedures ensures that loaded casks, transfer cars, and canisters are managed in the RH Bay in a manner to allow the movement of personnel, fire-protection equipment, spill-control equipment, and decontamination equipment. Within the Hot Cell, waste containers are not stored in multiple rows; similarly, within the Transfer Cell, the canister is located in a rack on the Transfer Cell Shuttle Car. Thus, aisle space does not apply to these areas. Aisle space requirements also do not apply to empty casks in racks. When CH or RH Packages contain waste in the Parking Area Container Storage

Unit, the Permittees shall maintain a minimum spacing of 4 ft (1.2 m) between trailers loaded with CH or RH Packages or between CH or RH Packages not on trailers.

<u>Underground Hazardous Waste Disposal Units (**HWDUs**)</u>

The mined areas underground are all maintained to provide free access to the repository and to the face of the waste disposal areas in the active panels. As specified in 30 CFR 57, adequate access is provided for movement of personnel, fire equipment, or spill-controlled equipment to any area of operations during an emergency or response action, as provided in the facility Contingency Plan (Permit Attachment F). These items are subject to inspection by Federal mine inspectors at least quarterly. Waste emplacement occurs sequentially on a room-by-room basis until each room in a HWDU panel has been filled with waste. Derived waste will be emplaced in the disposal rooms along with the TRU mixed waste. Once panel closure has been effected, the waste is considered disposed of, and access is no longer provided beyond the panel closure barrier to closed HWDUs.

Proper airflow distribution to all areas of the underground is achieved through a multi-step process. Tests and balances of the underground ventilation system are conducted on a periodic basis with the frequency depending on changes that are occurring in the configuration of the underground. These tests and balances physically measure airflow, pressure, and system resistance. Computer modeling is performed to determine the configuration necessary to achieve any desired underground airflow distribution. Administrative procedures are used as the means of assuring control of the configuration of the ventilation control devices such as bulkheads, doors, fans, and air regulators needed to achieve the desired configuration. Underground Facility Operations makes daily checks of air quality in all parts of the repository where personnel will be working. Air quantity checks are made on an as-needed basis as changing conditions warrant such checks.

E-2 <u>Preventive Procedures, Structures, and Equipment</u>

The WIPP facility has been designed and will be operated to fully meet each of the requirements of 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(8)), to prevent hazards associated with unloading operations, prevent runoff from hazardous waste handling areas, prevent contamination of water supplies, mitigate the effects of equipment and power failures, prevent undue exposure of personnel to hazardous waste, and prevent releases to the atmosphere. The individual regulatory requirements are discussed below.

E-2a <u>Unloading Operations</u>

The WIPP facility's equipment, structures, and procedures are specially designed for the safe handling of TRU mixed waste. Permit Attachments M1 and M2 detail how ~~contact-handled (**CH**)~~ CH and RH TRU mixed waste is handled, including unloading and transport operations. The following is a summary of the activities, structures, and equipment that were developed to prevent hazards in unloading of TRU mixed waste, as required by 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(8)(i)).

CH TRU Mixed Waste

The TRUPACT-II shipping container has a gross loaded weight of 19,265 lbs (8,737 kgs). The HalfPACT shipping container has a gross loaded weight of 18,100 lbs (8,210 kgs). The gross loaded weight is defined as the weight of the payload and the weight of the Contact Handled 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 (see Figure M1-9 in Permit Attachment M1). 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 ~~the facility~~ 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.

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 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 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.

<u>RH TRU Mixed Waste</u>

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 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, grade elevations of roads and surface facilities are designed so that storm water will not collect on the site under the most severe conditions.

Repository shafts are elevated at least 6 in. (15.2 cm) to prevent surface water from entering the shafts. The floor levels of all surface facilities are above the levels calculated for local flooding due to PMP events. Therefore, flooding of WIPP facility roads and surface structures is not expected from the flooding of surface waters as a result of PMP events or because of site-runoff design.

Flood-control structures are inspected as part of a general facility inspection at least annually. During this inspection, the structures are checked to assure there has been no wind or rain erosion or animal-caused damage that would cause the structures to fail. Further, the areas around the structures are inspected to ensure they are free of vegetation, debris, or other items that would impede the diversion of water. Experience with these structures has shown that annual structural inspections are adequate for the climate and soil conditions at the WIPP facility; however, inspections are also conducted after severe natural events, such as severe storms and a design basis earthquake.

Whenever TRU mixed waste is outside the WHB Unit, it will be contained in ~~Contact Handled~~ CH or RH Packages. TRU mixed waste containers are only unloaded from the shipping containers inside the WHB Unit and shipping containers are never opened outside this facility; therefore, TRU mixed waste is not expected to reach the outside environment or other parts of the facility from the TRU mixed waste handling facilities in nonflood circumstances. Flooding of the TRU mixed waste handling facilities is prevented by drainage ditches and berms such that there is no mechanism that might transport TRU mixed waste to the outside environment and between parts of the WIPP facility. Neither is there a mechanism to allow TRU mixed waste to find its way to an area of the WIPP site where it would be carried off site by flood or precipitation waters.

E-2c Water Supplies

At the WIPP facility, water supplied by a local water company enters a pair of 180,000-gal (681,372-L) aboveground storage tanks located adjacent to the Pumphouse. The 360,000-gal (1,362,744-L) combined capacity of the tanks is used as the potable water source and for fire control. These tanks are 32 ft (9.8 m) in diameter and are constructed of welded steel. The water level in each tank is inspected daily. Potable water is piped to the site and stored in tanks until distributed by pipe to the fire hydrants and buildings. Managing the potable water supply in this manner prevents the contamination of the supply by TRU mixed waste.

E-2d Equipment and Power Failure

The following description of procedures, structures, or equipment used at the facility to mitigate effects of equipment failure and power outages is required by 20.4.1.900 NMAC (incorporating

40 CFR §270.14(b)(8)(iv)). The specific systems and facilities related to the protection of human health and the environment during waste handling and management operations are discussed in the in Permit Attachment M1.

Utility power is fed to the WIPP site by two separate feeds in a ring bus configuration. This provides the capability to supply uninterruptible, redundant power to the site upon the loss of one feed. A redundant Southwestern Public Service (**SPS**) power feed has been installed. In the event that normal utility power is lost, on-site diesel generators will provide alternating current (**AC**) power to important WIPP facility electrical loads. Uninterruptible power supply (**UPS**) units are also on line providing power to important monitoring systems.

If utility power fails, the exhaust filter system goes into the fail position, and the system high-efficiency particulate-air filter dampers are placed into filtration position. When power is restored by the diesel generators, a decision is made whether to remain in filtration mode and energize a filtration fan or to realign the dampers into the minimum exhaust mode. Without any indication of a radiological release, the decision is usually the latter. TRU mixed waste handling and related operations cease upon loss of utility power and are not resumed until normal utility power is returned. All waste handling equipment will "fail safe," meaning that it will retain its load during a power outage.

In case of a loss of utility power, backup power to predetermined loads can be supplied by either of the two on-site diesel generators. Each of these units provide 480 volts (**V**) of power with a high degree of reliability and are sized to feed the selected loads. Each of the diesel generators can carry all preselected monitoring loads plus operation of the Air Intake Shaft hoist for personnel evacuation and other selected backup loads. The diesel generators can be brought on line within 30 minutes.

Upon loss of normal power, the diesel generators are manually started from the local control panel or from the CMR. The starter system is a 24-V battery system with a 300-ampere-hour capacity. Although it is standard practice to start the diesel generators from the local control panel, each unit can be remotely started from the CMR when the generator start switch is placed in the "remote" position. The diesel generators and associated breakers can be monitored in the CMR, thus providing the ability to feed selected facility loads from the backup power source, in sequence, without exceeding generator capacity. The on-site fuel storage capacity is sufficient for the operation of one generator at an expected load of 62 percent for three days. Additional fuel supplies are readily available within a few hours by tank truck, allowing on-line refueling and continued operation.

There is a Central UPS, located in the Support Building, that supplies power to selected loads located in the Support Building and WHB Unit. The Central UPS provides back-up power to equipment associated with radiation monitoring, communications, and central monitoring systems. In addition, individual UPSs are provided for the selected equipment associated with these same systems, but are located remotely from the Support Building and the WHB Unit. The CMR is also connected to the Central UPS.

In case of loss of AC power input to the UPSs, the dedicated batteries were designed to supply power to a fully loaded UPS for 30 minutes. It is expected that the AC power input to the UPS will be restored within 30 minutes, either from the off-site electric utility or from the site back-up power generator system.

Human health and the environment are protected during a loss of off-site power by a combination of factors:

- The underground filtration system fails in the “filter” mode so that no releases of contaminated particulates will occur
- The UPS maintains all monitoring systems and alarms in waste handling areas so that fires or pressure loss will be detected and an appropriate response initiated
- Generators are brought on line within 30 minutes, at which time hoisting can be initiated so that personnel do not have to stay underground for extended lengths of time.
- Decisions to evacuate underground personnel will be made in accordance with the requirements of the Mine Safety and Health Administration (**MSHA**)
- The waste hoist brakes set automatically so that loads do not fall
- Cranes retain their loads so that spills do not occur from dropped containers
- Communication systems are maintained
- The emergency operations center is powered if it is needed.

The CMS is a computerized system that collects, records, and displays data for all critical facility systems. The system is designed to provide a centralized, integrated location for collecting, monitoring, and storing facility parameters and is informed from signals provided by the seismic, meteorological, radiological effluent, and fire detection and alarm systems. Additionally, the CMS monitors heating, ventilation, air conditioning and electrical system status. Certain control functions of the underground ventilation fans, major facility electrical systems, and the backup diesel generators can be performed by the CMS from the CMR. The CMS can be set to alarm upon failure of the equipment monitored.

The CMS components of the WHB Unit and the Support Building are powered from the central UPS. The UPS features automatic switching without a loss of power from primary power to alternate power to battery backup power. The components located throughout the facility are powered by various electrical switchboards, with UPS battery backup.

The major components of the system are interconnected by means of a redundant network. The network is the communications medium for the CMS and consists of network cables routed throughout the facility. The network is designed such that no single point failure will cause failure of the entire network. Parameters or status are monitored by Local Processing Units strategically located throughout the surface and underground facility.

In addition, a number of automatic checks are performed on the internal processes associated with system components and network communications. If any fault is detected, the system has the capability to remove a component from the network and alert the CMR Operator (**CMRO**) of the fault. The status of the network is continuously monitored by the CMRO 24 hours per day, seven days per week. If a fault occurs, the CMRO initiates an AR within the Work Control system to correct the problem.

The RH Complex is included in the WHB. The Central UPS supplies power to the WHB which includes the RH Complex. The RH Bay, Hot Cell and Transfer Cell equipment are serviced by dual 1,300 KW diesel powered generators located between the exhaust shaft and the WHB. The generators provide backup power to both CH and RH waste handling operations. The RH waste handling equipment is designed to stop as a result of loss of power in a fail-safe condition. Power from the back-up generators may be utilized to place RH TRU mixed waste containers in process into a safe configuration. During a total power outage condition selected RH loads can be powered by the Central UPS. Within a short time selected RH loads at 480 volts and below can be powered by the Backup Diesel Generators. The backup central UPS for the WHB would also supply backup power to the RH Complex.

E-2e Personnel Protection

The following description of procedures, structures, or equipment used at the facility to prevent undue exposure of personnel to hazardous waste is required by 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(8)(v)).

Procedures used at the WIPP facility to prevent undue exposure of personnel to hazardous waste and the sections in this permit application where these procedures are discussed in detail are listed below.

- The TSDF-WAC are criteria designed to prevent the shipment or acceptance of TRU mixed waste exhibiting the characteristics of ignitability, corrosivity, or reactivity.

- Written procedures to prevent the addition of materials to the TRU mixed waste that could exhibit incompatibility or the characteristics of reactivity and/or ignitability are discussed in Section E-3 of this Permit Attachment.

- The shipping containers, forklifts, unloading dock, crane, facility pallets, containment pallets, facility transfer vehicle, waste hoist cage, 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 are 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, 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.

- TRU mixed waste handling operations are conducted so that the need for TRU mixed waste handling personnel to touch the TRU mixed waste containers during unloading, overpacking (if necessary), and emplacement operations is minimized. Appropriate personal protective equipment (**PPE**) will be used depending on locations and operations (e.g., steel-toed shoes, hard hat, safety glasses inside a crane operating envelope; steel-toed shoes, hard hat, mine lamp, self rescuer, and safety glasses in the Underground).

- Tagout/Lockout and work authorization procedures, discussed in Section D-1, prohibit WIPP facility personnel from utilizing TRU mixed waste handling equipment that is temporarily out of service and prevent inappropriate use of TRU mixed waste handling equipment that is not operational for all uses.

- A system for monitoring and inspecting monitoring equipment, safety and emergency systems, security devices, and operating and structural equipment is in place to prevent, detect, or respond to environmental or human health hazards caused by hazardous waste. The inspection/monitoring requirements are described in Permit Attachment D.

- 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, and underground waste transporter were designed or selected for use in order to minimize the need for TRU mixed waste handling personnel to come into contact with 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 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 exhaust.

- The WIPP facility has internal and external communications and alarm systems to notify personnel of emergency situations and provide instructions for response, evacuation, etc. as discussed in this Permit Attachment and Permit Attachment F.

- The WIPP facility is well equipped with spill-response equipment, transport vehicles, emergency medical equipment and rescue vehicles, fire detection, fire-suppression and firefighting equipment (including water for fire control), PPE, emergency lighting and backup power, and showers and eye-wash fountains. These are discussed in Sections E-1a, E-2C and E-2d of this Permit Attachment and are listed in Permit Attachment F.

- The surface and underground ventilation systems, discussed in Permit Attachment M2, are designed to provide personnel with a suitable environment during routine operations.

E-2f Releases to Atmosphere

The following description of procedures, structures, or equipment used at the facility to prevent releases to the atmosphere is required by 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(8)(vi)).

All TRU mixed waste will be contained. TRU mixed waste container vents employ particulate filters that prevent particulate releases to the atmosphere. The nature of the waste itself also mitigates potential releases to the atmosphere. Lead and other heavy metals, which could exhibit the characteristic of toxicity, may be present in some TRU mixed waste forms. The metal in the TRU mixed waste, most of which is lead in monolithic form, is present in bricks and shielding rather than in particulate form. The primary sources of other metals are sheets, rods, plating, equipment parts, or solidified sludges.

A release of hazardous waste or hazardous constituents to the air that may have adverse effects on human health or the environment is unlikely. Although VOCs could be present in the TRU mixed waste emplaced within the unit and could potentially be a source of release to the air, the confirmatory volatile organic compound monitoring plan described in Permit Attachment N will be used to confirm that there is no adverse effects on human health and the environment.

E-2g Flammable Gas Concentration Control

Gas concentrations in the mine and around the underground HWDUs are controlled by mechanically induced ventilation. There are two primary ventilation fans and three filtration fans. If only one primary ventilation fan is ventilating the mine, it typically will be set to draw 260,000 ft^3 (7,358 m^3) per minute of air through the mine, which is sufficient to adequately ventilate all active areas in the mine. If both primary fans are operating, they will typically be set to draw 425,000 ft^3 (12,028 m^3) per minute of air through the mine. The filtration fans are interlocked so that only one filtration fan can operate at any time in the filtration mode. One filtration fan is normally set to draw 60,000 ft^3 (1,698 m^3) per minute of air through the mine. The air is routed through the underground facility with bulkhead doors and dampers to achieve the most efficient use of the air in ventilating for possible gases and maintaining required differential pressures in the underground facility.

The WIPP Mine Ventilation Plan are updated a least once a year or more often to accommodate changing underground conditions. Dead end drifts are fairly common in underground mines. Ventilation to accessible dead end drifts is provided by auxiliary fans and ducts to the extent necessary. Minimum requirements for air quantity, quality, and air flow velocity depend on the level of activity in a given area and are governed by Federal (30 CFR §57, Subpart G) and State regulations. Compliance with those regulations is monitored by facility personnel and through frequent inspections by regulatory authorities.

The WIPP Industrial Hygienist is responsible for monitoring and/or testing the air in the underground. The tests are on an as needed basis, in areas where chemicals are stored, and in areas where people are working that may contain hazardous concentrations of airborne fumes, mists, or vapors. All surveys are recorded; records contain location, time, job description, or occurrences associated with the contaminants, and the identification of instruments used.

Underground Facility Operations checks the underground air quality on a daily basis in all open drifts utilizing instrumentation which indicates Oxygen, Carbon Monoxide, and Flammable Gas concentration. The results of the monitoring are entered in the Shift Log Daily. If conditions are found that exceed established criteria, additional notification is made to the CMR. Appropriate actions are taken to determine the type of gases and impact on mine activities. The readings taken during specific tests for unusual conditions are recorded in the Daily Shift Log. All the monitoring performed by Underground Facility Operations is in accordance with MSHA (30 CFR §57).

Portable air monitoring equipment is used to assure access to all areas where air quality may be of concern. Two types of measuring systems are used at the WIPP: Draeger Pump Systems and Portable Air Monitoring Instruments. Prior to use, all instruments must have certification of current calibration and check gases must also be certified as accurate within one percent of the label concentration. Instruments are used within the guidelines established by the manufacturers and are accompanied with suitable temperature, barometric and relative humidity measurements (as required). Functional testing of instruments must be done before each use and the results must fall within the ranges specified in air monitoring procedures. Gases that are to be tested include oxygen, methane, carbon monoxide, hydrogen sulfide, sulphur dioxide, nitrogen dioxide, and chlorine. Alarm levels are set for each gas. Typical settings are as follows: O_2: 19.5% LOW; 23.0% HIGH; CH_4: 0.25%; CO: 25 ppm; H_2S: 10 ppm; SO_2: 2 ppm; NO_2: 1 ppm; Cl_2: 0.5 ppm. When alarm levels are reached, Industrial Safety is contacted to evaluate the conditions and to determine the appropriate actions. Equipment operation is by trained personnel only, or under the supervision of trained personnel. Air Quality sampling is performed as often as needed to assure safe working conditions. If conditions are worsening, or action has been taken to mitigate high levels of contamination, the frequency of measurement is increased. Underground air quality is checked at the beginning of the day when personnel are underground.

E-3 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste

20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(9)), requires a description of precautions taken to prevent accidental ignition or reaction of ignitable, reactive, or incompatible TRU mixed waste as required to demonstrate compliance with 20.4.1.900 NMAC (incorporating 40 CFR §270.15(c)), and 20.4.1.500 NMAC (incorporating 40 CFR §264.17). Because the TRU mixed waste (including the container) received at the facility during the Disposal Phase and any derived TRU mixed waste have been demonstrated to be compatible and do not exhibit the characteristics of ignitability, reactivity, or corrosivity, the WIPP facility is in full compliance with these regulations.

ATTACHMENT F

RCRA CONTINGENCY PLAN

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ATTACHMENT F

RCRA CONTINGENCY PLAN

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ATTACHMENT F

RCRA CONTINGENCY PLAN

Introduction

The WIPP facility is owned and co-operated by the Department of Energy (**DOE**) and co-operated by its designated Management and Operating Contractor (**MOC**) (Permit Condition I.D.3).

This Contingency Plan was prepared in accordance with the Resource Conservation and Recovery Act (**RCRA**) requirements codified in Title 20 of the New Mexico Administrative Code, Chapter 4.1.500 (20.4.1.500 NMAC, incorporating 40 CFR §264.50 to §264.56), "Contingency Plan and Emergency Procedures," and submitted in compliance with 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(7)). The purpose of this document is to define responsibilities, to describe coordination of activities, and to minimize hazards to human health and the environment from fires, explosions, or any sudden or nonsudden release of hazardous waste, or hazardous waste constituents to air, soil, or surface water (20.4.1.500 NMAC (incorporating 40 CFR §264.51 [a])). This plan consists of descriptions of processes and emergency responses specific to hazardous substances, contact-handled (**CH**) and remote-handled (**RH**) transuranic (**TRU**) mixed waste and other hazardous waste handled at the WIPP facility. ~~This permit does not authorize the disposal of remote-handled (**RH**) waste.~~

F-1 General Information

The WIPP facility is located 26 miles (mi) (42 kilometers [km]) east of Carlsbad, in Eddy County in southeastern New Mexico, and includes an area of 10,240 acres (ac) (4,144 hectares [ha]). The facility is located in an area of low-population density, with fewer than 30 permanent residents living within a 10 mi (16 km) radius of the facility. The area surrounding the facility is used primarily for grazing, potash mining, and mineral exploration. Resource development that would affect WIPP facility operations or the long-term integrity of the facility is not allowed within the 10,240 ac (4,144 ha) that have been set aside for the WIPP Project.

The WIPP facility is designed to receive containers of TRU waste, which will be transported to the WIPP facility from the ten major and other minor DOE TRU mixed waste generator and/or storage sites. The waste will be emplaced in the bedded salt of the Salado Formation, 2,150 feet (ft) (655 meters [m]) below ground surface.

As a geologic facility for the management of TRU mixed waste, the WIPP repository is regulated as a "miscellaneous unit," as defined under 20.4.1.500 NMAC (incorporating 40 CFR §264.601 to §264.603). The areas at the WIPP facility subject to ~~RCRA permitting~~ this permit include the surface container storage areas in the Waste Handling Building (**WHB**) Container Storage Unit (**WHB Unit**) and the Parking Area Container Storage Unit (**Parking Area Unit**), located south of the WHB ~~Unit~~, and the areas below ground in which waste will be emplaced.

The WIPP facility includes other surface structures, shafts, and underground areas (Figures F-1, F-2, and F-3). Surface structures other than the WHB, that support TRU mixed waste management include:

Exhaust Filter Building - houses the filter banks to which the underground ventilation can be diverted in the unlikely event of an underground release of radionuclides.

Guard and Security Building - houses the facility security personnel and communications equipment necessary for them to perform their duties. Section F-4a specifies the duties of the security officers relative to contingency actions.

Safety and Emergency Services Building - houses the surface emergency response vehicles (fire truck, rescue truck, ambulance), Health Services (first aid), Emergency Operations Center, and the Dosimetry Laboratory. The Hazardous Material Response Trailer is staged at the WIPP facility in an area that is readily accessible to Emergency Services. Emergency Services is located in Building 452. Table F-6 describes emergency equipment and associated locations.

Support Building - houses the Central Monitoring Room (see section F-4a).

Transuranic Package Transporter-II (**TRUPACT-II**) Maintenance Facility - is located west of the CH bay. No TRU mixed waste management activities will occur in this facility.

Surface facilities used for storage of support equipment are identified in Table F-6.

Building 452, Safety and Emergency Services Facility, houses the emergency response vehicles, emergency equipment, the mine rescue room, mine rescue team equipment, and the Emergency Operations Center (**EOC**). The Hazardous Material Response Trailer is staged at the WIPP facility in an area readily accessible to Emergency Services. Emergency Services is located in Building 452.

The RCRA permit addresses TRU mixed waste management activities in the WHB Unit, the Parking Area Unit, and the disposal units. The provisions of this Contingency Plan apply to hazardous waste disposal units (**HWDU**) in the underground waste disposal panels, storage in the WHB Unit and the Parking Area Unit, the Waste Shaft, and supporting TRU mixed waste handling areas. The remainder of the facility will not manage TRU mixed waste. This Contingency Plan has also been designed in accordance with 20.4.1.300 NMAC (incorporating 40 CFR § 262.34(a)(4) - Standards for Generators of Hazardous Waste), and will be implemented whenever there is a fire, explosion, or release of hazardous waste which could threaten human health or the environment. Hazardous substances in the remainder of the facility are included as possible triggers of the Contingency Plan but are outside the scope of the regulations promulgated pursuant to RCRA. This allows WIPP to maintain one emergency response plan which is consistent with the National Response Teams Integrated Contingency Plan Guidance (Federal Register, Vol. 61, No. 109, June 5, 1996). Inclusion is based on their National Fire Protection Association (**NFPA**) ratings in addition to their storage quantities. The majority of hazardous substances on-site are not expected to trigger the ~~c~~Contingency ~~p~~Plan because they are present in the same form and concentration as the product packaged for distribution and use by the general public or are used in a laboratory under the direct supervision of a technically qualified individual. Superfund Amendments and Reauthorization Act (**SARA**) Title III excludes these from emergency planning reporting. The list of hazardous substances in large enough quantities to constitute a Level II incident (Section F-3) is provided in Table F-1. In addition to TRU mixed waste, these are the only hazardous substances currently on site which, if spilled, may be of sufficient impact to cause this Contingency Plan to be implemented. Magnesium Oxide (**MgO**) is stored on-site in large quantities. It is used as backfill in the waste emplacement rooms as a pH buffer. The pH buffer will limit the solubility of radionuclides after the underground rooms are filled and closed. MgO is not a hazardous substance, a release of MgO will not create hazardous waste and poses no threat to human health or the environment, and is therefore not addressed in the Contingency Plan.

Wastes generated as a result of maintenance or response actions will be categorized into one of three groups and disposed of accordingly. These are: 1) nonhazardous wastes to be disposed of in an approved landfill, 2) hazardous nonradioactive wastes to be disposed of at an off-site RCRA permitted facility, and 3) TRU mixed waste to be disposed of in the underground HWDUs. Disposal of TRU mixed waste in the WIPP facility is subject to regulation under 20.4.1.500 NMAC. As required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601), the Permittees will demonstrate that the environmental performance standards for a miscellaneous unit, which are applied to the HWDUs in the underground, will be met. In addition, the technical requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.170 to §264.178) are applied to the operation of the container storage units in the WHB Unit and in the Parking Area Unit south of the WHB. Liquid wastes that may be generated as a result of the fire fighting water or decontamination solutions will be managed as follows:

Non-Mixed - Hazardous waste liquids contaminated only with hazardous constituents will be placed into containers and managed in accordance with 20.4.1.300 NMAC (incorporating 40 CFR §262.34) requirements. The waste will be shipped to an approved off-site treatment, storage, or disposal facility.

Mixed - Liquids contaminated with TRU mixed waste (inside the WHB Unit) will be solidified as they are placed into containers with cement, Aquaset, or absorbent material in them. The solidified materials will be disposed of in the underground WIPP repository as derived waste.

This chapter of the permit application describes the HWDUs, the TRU mixed waste management facilities and operations, compliance with the environmental performance standards, and with the applicable technical requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.170 to §264.178 and §264.601, respectively). The configuration of the WIPP facility consists of completed structures; including all buildings and systems for the operation of the facility.

F-1a Disposal Phase Overview

The Disposal Phase will consist of receiving CH TRU mixed waste shipping containers, unloading and transporting the waste containers to the underground HWDUs, emplacing the waste in the underground HWDUs, and subsequently achieving closure of the underground HWDUs in compliance with applicable State and Federal regulations.

The TRU mixed waste that will be disposed at the WIPP facility results primarily from activities related to the reprocessing of plutonium-bearing reactor fuel and fabrication of plutonium-bearing weapons, as well as from research and development. This TRU mixed waste consists largely of such items as paper, cloth, and other organic material; laboratory glassware and utensils; tools; scrap metal; shielding; and solidified sludges from the treatment of wastewater. Much of this TRU mixed waste is also contaminated with substances that are defined as hazardous under 20.4.1.200 NMAC.

F-1b Waste Description

Waste destined for WIPP are, or were, produced as a byproduct of weapons production and have been identified in terms of waste streams based on the processes that produced them. Each waste stream identified by generators is assigned to a Waste Summary Category to facilitate RCRA waste characterization, and reflect the final waste forms acceptable for WIPP disposal.

These Waste Summary Categories are:

S3000—Homogeneous Solids
Solid process residues defined as solid materials, excluding soil, that do not meet the applicable regulatory criteria for classification as debris (20.4.1.800 NMAC (incorporating 40 CFR §268.2[g] and [h])). Included in solid process residues are inorganic process residues, inorganic sludges, salt waste, and pyrochemical salt waste. Other waste streams are included in this Waste Summary Category based on the specific waste stream types and final waste form. This category includes wastes that are at least 50 percent by volume solid process residues.

S4000—Soils/Gravel
This waste summary category includes waste streams that are at least 50 percent by volume soil. Soils are further categorized by the amount of debris included in the matrix.

S5000—Debris Wastes
This waste summary category includes waste that is at least 50 percent by volume materials that meet the criteria for classification as debris (20.4.1.800 NMAC (incorporating 40 CFR §268.2)). Debris is a material for which a specific treatment is not provided by 20.4.1.800 NMAC (incorporating 40 CFR §268 Subpart D), including process residuals such as smelter slag from the treatment of wastewater, sludges or emission residues.

> Debris means solid material exceeding a 2.36 inch (60 millimeter) particle size that is intended for disposal and that is: 1) a manufactured object, 2) plant or animal matter, or 3) natural geologic material.

Included in the S5000 Waste Summary Category are metal debris, lead containing metal debris, inorganic nonmetal debris, asbestos debris, combustible debris, graphite debris, heterogeneous debris, and composite filters, as well as other minor waste streams. Particles smaller than 2.36 inches in size may be considered debris if the debris is a manufactured object and if it is not a particle of S3000 or S4000 material.

Examples of waste that might be included in the S5000 Waste Summary Category are asbestos-containing gloves, fire hoses, aprons, flooring tiles, pipe insulation, boiler jackets, and laboratory tabletops. Also included are combustible debris constructed of plastic, rubber, wood, paper, cloth, graphite, and biological materials. Examples of graphite waste that would be included are crucibles, graphite components, and pure graphite.

Wastes may be generated at the WIPP facility as a direct result of managing the TRU and TRU mixed wastes received from the off-site generators. Such generated waste may occur in either the WHB Unit or the Underground. For example, when TRU mixed wastes are received at the WHB Unit, the ~~Contact Handled~~ CH or RH Package shipping containers and the TRU mixed waste containers are checked for surface contamination. Under some circumstances,[1] if contamination is detected, the shipping container and/or the TRU mixed waste containers will be decontaminated. In the underground, waste may be generated as a result of radiation control procedures used during monitoring activities. The waste generated from radiation control procedures will be assumed to be TRU and/or TRU mixed waste. Throughout the remainder of this plan, this waste is referred to as "derived waste." All such derived waste will be placed in the rooms in HWDUs along with the TRU mixed waste for disposal.

F-1c Containers

The waste containers that will be used at the WIPP facility qualify as "containers," in accordance with 20.4.1.101 NMAC (incorporating 40 CFR §260.10). That is, they are "portable devices in which a material is stored, transported, treated, disposed of, or otherwise handled."

TRU mixed waste containers, containing off-site waste, will not be opened at the WIPP facility. Derived waste containers are kept closed at all times unless waste is being added or removed.

Liquid waste, including “derived waste” containing liquids, will not be emplaced in the WIPP. TRU mixed waste for emplacement in the WIPP shall contain as little residual liquid as is reasonably achievable. All internal containers (e.g., bottles, cans, etc.) will be well-drained, but may contain residual liquids. As a guideline, residual liquids in well-drained containers will be restricted to approximately one percent of the volume of the internal container. In no case shall the total liquid equal or exceed one volume percent of the waste container (~~e.g.~~ i.e., drum, ~~or~~ standard waste box [**SWB**], ten-drum overpack, or canister).

Special requirements for ignitable, reactive, and incompatible waste are addressed in 20.4.1.500 NMAC (incorporating 40 CFR §§264.176 and 177). The RCRA Permit Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (**TSDF-WAC**) precludes ignitable, reactive, or incompatible TRU mixed waste from being placed into storage or disposed of at ~~the~~ WIPP.

[1]Typically contamination that is less than six square feet in area and less than 2000 disintegrations per minute (dpm) alpha or 20,000 dpm beta/gamma, may be decontaminated. Containers that exceed these thresholds will be returned to the point of origin for decontamination.

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 ~~Unit~~ is the surface facility where waste handling activities will take place. The WHB ~~Unit~~ has a total area of approximately 84,000 square feet (ft^2) (7,80~~3~~4 square meters [m^2]) of which ~~33,175~~ 43,053 ft^2 (~~3,083~~ 4,000 m^2) are designated as the WHB Unit for TRU mixed waste management. Within the WHB Unit, 25,650 ft^2 (2,383 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. ~~This~~ These areas are ~~is~~ being permitted as ~~a~~ 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

~~The typical processing rate for CH waste is 14 Contact Handled Packages per day, and the maximum is 28 per day. Two shifts per day are planned; four days per week. The fifth day is for equipment maintenance with weekends available for more extensive maintenance, when necessary.~~

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 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 facility pallets of waste during normal operations. These pallets will typically be staged in this area for a period of up to five days.

In addition, four Contact-Handled Packages, containing up to ~~530.4~~ 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 10 drums and 6 loaded canisters (262~~.02~~ ft^3 (7.4~~2~~ m^3)) may be stored in the Hot Cell. 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~~3~~ 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 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~~3~~ 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 ~~space for 12~~ storage for up to 7,160 ft^3 (203 m^3) of CH and/or RH TRU mixed waste contained in up to 50 loaded Contact-Handled Packages and 14 Remote-Handled Packages ~~corresponding to 1,591 ft^3 (45 m^3) of CH TRU mixed waste~~. Secondary containment and protection of the waste containers from standing rainwater are provided by the transportation containers.

~~Twelve Contact Handled Packages containing a maximum of 1,591 ft^3 (45 m^3) of CH TRU mixed waste can be stored in the Parking Area Unit.~~ The safety criteria for Contact-Handled and

Remote-Handled Packages require that they be opened and vented at a frequency of at least once every 60 days. During normal operations ~~the maximum residence time of any one container in the Parking Area Unit is typically five days. Therefore, during normal waste handling operations~~, Contact-Handled and Remote-Handled Packages will not require venting while located in the Parking Area Unit. Any off-normal event which results in the need to store a waste container in the Parking Area Unit for a period of time approaching fifty-nine (59) days shall be mitigated by returning the shipment to the generator prior to the expiration of the 60 day NRC venting period or by moving the Contact-Handled or Remote-Handled Package inside the WHB Unit where the waste will be removed and placed in one of the permitted storage areas or in the underground hazardous waste disposal unit.

F-1f Off-Normal Events

Off-normal events could interrupt normal operations in the waste management process line. Shipments of waste from the generator sites will be stopped in any event which results in an interruption to normal waste handling operations that exceeds three days.

F-1g Containment

The WHB Unit has concrete floors, which are sealed with a coating designed to resist all but the strongest oxidizing agents. Such oxidizing agents do not meet the TSDF-WAC and will not be accepted in TRU mixed waste at the WIPP facility. Therefore, TRU mixed wastes pose no compatibility problems with respect to the WHB Unit floor.

During normal operations, the floor of the normal storage areas within the CH Bay and RH Complex shall be visually inspected on a weekly basis to verify that it is in good condition and free of obvious cracks and gaps. When a RH TRU mixed waste container is present in the RH Complex, inspections will be conducted visually and/or using a closed-circuit television camera in order to manage worker dose and minimize radiation exposures. Manual inspections of the areas are performed at least annually during routine maintenance periods when waste is not present.

Floor areas of the WHB used during off-normal events will be inspected prior to use and weekly while in use. Containers located in the permitted storage areas shall be elevated from the surface of the floor. Facility pallets provide at least 6 in (15 centimeters [cm]) of elevation from the surface of the floor. TRU mixed waste containers that have been removed from Contact-Handled or Remote-Handled Packages shall be stored at a designated storage area inside the WHB so as to preclude exposure to the elements.

Secondary containment at permitted storage areas inside the WHB Unit shall be provided by the floor. The Parking Area Unit and TRUDOCK storage area of the WHB Unit do not require engineered secondary containment, since waste is not stored there unless it is protected by the Contact-Handled or Remote-Handled Packaging. Floor drains, the fire suppression water collection sump, and portable dikes, if needed, will provide containment for liquids that may be generated by fire fighting. Sump capacities and locations are shown in Drawing 41-F-087-014. Residual fire fighting liquids will be placed in containers and managed as described above. Secondary containment at storage locations inside the RH Bay, Cask Unloading Room, Transfer Cell, and Facility Cask Loading Room is provided by the cask or canisters that contain drums of RH TRU mixed waste. In the Hot Cell, secondary containment is provided by the Hot Cell subfloor. In addition, the RH Complex contains a 220-gallon (833-L) sump in the Hot Cell, a 11,400-gallon (43,152-L) sump in the RH Bay, and a 220-gallon (833-L) sump in the Transfer Cell to collect any liquids.

F-2 Response Personnel

Persons qualified to act as the RCRA Emergency Coordinator, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.55), are listed in Table F-2.

A RCRA Emergency Coordinator will be on-site at the WIPP facility 24 hours a day, seven days a week, with the responsibility for coordinating emergency response measures. RCRA Emergency Coordinators are listed in Table F-2, where four individuals have been designated primary RCRA Emergency Coordinators. This is because the on-duty Facility Shift Manager (**FSM**) is designated as the RCRA Emergency Coordinator. The four individuals shown serve as FSM on a rotating shift basis.

Persons qualified to act as the RCRA Emergency Coordinator are thoroughly familiar with this Contingency Plan, the TRU mixed waste and hazardous waste operations and activities at the WIPP facility, the locations of TRU mixed waste and hazardous waste activities, the locations on the site where hazardous materials are stored and used, and the locations of waste staging and accumulation areas. They are familiar with the characteristics of hazardous substances, TRU mixed waste and hazardous waste handled at the WIPP facility, the location of TRU mixed waste and hazardous waste records within the WIPP facility, and the facility layout. In addition, persons qualified to act as the RCRA Emergency Coordinator have the authority to commit the necessary resources to implement this Contingency Plan. Figure F-4 outlines the RCRA Emergency Coordinator's position relative to other organizations that provide support.

In addition to the RCRA Emergency Coordinator, the following individuals or groups have specified responsibilities during any WIPP facility emergency:

- Assistant Chief Office Warden (**ACOW**)—Persons assigned to take accountability for sections of the site, and then reporting the accountability to the Chief Office Warden.

- Central Monitoring Room Operator (**CMRO**)—The on-shift operator responsible for Central Monitoring Room (**CMR**) operations, including coordination of facility communications. The facility log is maintained by the CMRO.

- Chief Office Warden (**COW**)—A predesignated individual with responsibilities for complete surface accountability at staging areas in the event of an evacuation. The Chief Office Warden receives reports from the ACOWs.

- Emergency Response Team (**ERT**)—Supplemental group trained to respond to surface emergencies, to provide emergency first aid, and to respond to releases of hazardous waste or hazardous material. ERT members are part of the WIPP Supplemental Emergency Response Program.

- Emergency Services Technician (**EST**)/ Fire Protection Technician (**FPT**)—Regular employee whose job is that of full-time emergency responder. During non-emergency conditions, the EST/FPT inspects facility fire suppression systems and emergency equipment. The EST/FPT completes specific sections of the "WIPP Hazardous Material Incident Report." Additional technical personnel complete identified sections of the report.

- Fire Brigade—The fire brigade is a team of five personnel who respond to site emergencies. The team consists of an Incident Commander and four fire fighters. The fire fighters are trained in accordance with NFPA Standards for Industrial Fire Brigades (Fire Brigades that perform both advanced exterior and interior structural fire fighting).

- First Line Initial Response Team (**FLIRT**)—Supplemental primary responders in the event of a general underground emergency for medical and hazardous material response. The FLIRT also provides backup support for the ERT in the event of a general surface-facility emergency. FLIRT members are part of the WIPP Supplemental Emergency Response Program.

- Mine Rescue Team (**MRT**)—Supplemental group responsible for underground reentry and rescue after an emergency evacuation. The MRT responds in accordance with 30 CFR Part 49 requirements. MRT members are part of the WIPP Supplemental Emergency Response Program.

- Office Warden—An individual assigned responsibility for assuring that personnel are evacuated from his/her assigned area or building during evacuations. Office Wardens maintain a list of all personnel in their specific area. This list is compared with the physical presence of personnel who assemble at the staging areas. The Office Wardens report area accountability to the ACOWs.

- EOC Staff-The EOC consists of a minimum staff, which includes MOC management personnel, three Operations representatives, one Environment, Safety, and Health representative (**ES&H**), and one Emergency Management representative. The EOC staff can also include technical and logistic support personnel from other Permittee organizations, as necessary. Additional administrative support staff is made available from site personnel, these personnel provide message runners, communications, and computer assistance. The EOC is activated by the FSM. Since EOC staff are performing duties similar to their normal job functions and providing support related to their area of expertise, no specific RCRA training is required.

F-3 Implementation

The provisions of this Contingency Plan will be implemented immediately whenever there is an emergency event (e.g., a fire, an explosion, or a natural occurrence that involves or threatens hazardous or TRU mixed wastes or a release of hazardous substances, hazardous materials, or hazardous wastes) that could threaten human health or the environment, or whenever the potential for such an event exists as determined by the RCRA Emergency Coordinator, as required under 20.4.1.500 NMAC (incorporating 40 CFR §264.51(b)). The following information is utilized for categorization of events to determine implementation of the ~~c~~Contingency ~~p~~Plan:

1. Medical Emergencies (does not implement the Contingency Plan)

2. Non-emergency (does not implement the Contingency Plan)

    a. Fire already out, did not involve any hazardous materials.
    b. Spill or release involved materials excluded according to the SARA Title III, Statute 42 U.S.C. 11021 (e). Such as:

        1) Any substance present in the same form and concentration as product packaged for distribution and use by the general public. (Example: Cleaning solutions)
        2) Any substance to the extent it is used in a laboratory under the direct supervision of a technically qualified individual.
        3) Petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance by Comprehensive Environmental Response, Compensation and Liability Act (**CERCLA**).

3. Incident Level I: According to the NFPA 471, Responding to Hazardous Materials Incidents (See Table F-3). If the product(s) involved in the fire, explosion, spill or leakage meets the following criteria, it will be classified as a Level I incident and does not implement the Contingency Plan.

    a. The product does not require a U.S. Department of Transportation (**DOT**) placard, is a NFPA listed 0 or 1 for all categories, or is Other Regulated Materials A, B, C, or D.

    b. The fire is under control and the reactivity rating of the material is less than a rating 2, indicating a low potential for subsequent explosion as the hazardous material can be considered normally stable.

    c. There was no release or the release can be confined with readily available resources.
    d. There is no life-threatening situation.
    e. There is no potential environmental impact.

4. Incident Level II: According to NFPA 471, Responding to Hazardous Materials Incidents, (See Table F-3). If the product(s) involved in the fire, explosion, spill or

leakage meets the following criteria, it will be classified as a Level II incident and the Contingency Plan will be implemented by the RCRA Emergency Coordinator.

a. The product requires a DOT placard, is an NFPA 2 for any categories, or is Environmental Protection Agency (**EPA**) regulated waste (Site-specific: Table F-1 and TRU mixed waste) AND
b. The incident involves multiple packages.
c. There is potential for the fire to spread since the hazardous material's flammability level (rating 2) is below 200 degrees Fahrenheit, or the reactivity (rating 2) indicates that violent chemical changes are possible and thus may be explosive.
d. The release may not be controllable without special resources.
e. The incident requires evacuation of a limited area for life safety.
f. The potential for environmental impact is limited to soil and air within incident boundaries.
g. The container is damaged but able to contain the contents to allow handling or transfer of product.

5. Incident Level III: According to NFPA 471, Responding to Hazardous Materials Incidents. (See Table F-3) If the product(s) involved in the fire, explosion, spill or leakage meet the following criteria, it will be classified as a Level III incident and the Contingency Plan will be implemented by the RCRA Emergency Coordinator.

a. The product is a poison A (gas), an explosive A/B, organic peroxide, flammable solid, material that is dangerous when wet, chlorine, fluorine, anhydrous ammonia, NFPA 3 and 4 for any categories including special hazards, EPA extremely hazardous substances, and cryogenics.
b. The site-specific container size for this incident level will be a tank truck.
c. There is potential for the fire to spread since the hazardous material's flammability level (rating 3 or 4) is below 100 degrees Fahrenheit, or the reactivity (rating 3 or 4) indicates that the material may explode.
d. The release may not be controlled even with special resources.
e. The incident requires mass evacuation of a large area for life safety.
f. Even though the NFPA guidelines for this incident level indicate that the potential for environmental impact is severe, due to the site engineering controls, the impact is contained within the HWMUs.
g. The container is damaged to such an extent that catastrophic rupture is possible.

The above categories include fire situations, weather conditions, natural phenomena, and explosions which will have to be evaluated to make an incident level determination. A Level II (potential threat to human health in localized area, potential for moderate on-site environmental impact) or Level III (potential threat to human health in a larger area, potential for severe environmental impact) incident by definition is considered to be a potential threat to human health or the environment and, therefore, is considered to be an emergency requiring activation of the Contingency Plan.

F-4 Emergency Response Method

Methods that describe how and when the WIPP Contingency Plan will be implemented cover the following 11 implementation areas:

1. Notification (Section F-4a)
2. Identification of hazardous materials (Section F-4b)
3. Assessment of the nature and extent of the emergency (Section F-4c)
4. Control, containment, and correction of the emergency (Section F-4d)
5. Prevention of recurrence or spread of fires, explosions, or releases (Section F-4e)
6. Management and containment of released material and waste (Section F-4f)
7. Incompatible waste (Section F-4g)
8. Post-emergency facility and equipment maintenance and reporting (Section F-4h)
9. Container spills and leakage (Section F-4i)
10. Tank spills and leakage (Section F-4j)
11. Surface impoundment spills and leakage (Section F-4k)

F-4a Notification

Notification requirements in the event of an emergency at a RCRA hazardous waste management facility are defined by 20.4.1.500 NMAC (incorporating 40 CFR §§264.56(a) and (d)). Necessary notifications in case of an emergency at the WIPP facility are described in this section (Figure F-4a). Personnel at the WIPP facility are trained to respond to emergency notifications.

F-4a(1) Initial Emergency Response and Alerting the RCRA Emergency Coordinator

The first person to become aware of an incident shall immediately report the situation to the CMRO, and provide the following information, as appropriate:

- Name and telephone number of the caller
- Location of the incident and the caller
- Time and type of incident
- Severity of the incident
- Magnitude of the incident
- Cause of the incident

- Assistance needed to deal with or control the incident
- Areas or personnel affected by the incident

In addition to receiving incident reports, the CMRO, who is located in the Support Building (Building 451) (Figure F-1), continuously monitors (24 hours a day) the status of mechanical, electrical, and/or radiological conditions at selected points on the site, both above and below ground. Alarms to indicate abnormal conditions are located throughout the WIPP facility. The alarm(s) (e.g., fire, radiation) may be the first notification of an emergency situation received by the CMRO. The CMRO monitors alarms, takes telephone calls and radio messages, and initiates outgoing calls to emergency staff and outside agencies.

Once the CMRO is notified of a fire, explosion, or a release anywhere in the facility (either by eyewitness or an alarm), the RCRA Emergency Coordinator is immediately notified. Once notified, the RCRA Emergency Coordinator assumes responsibility for the management of activities related to the assessment, abatement, and/or cleanup of the incident.

A RCRA Emergency Coordinator is on-site at all times and, therefore, can be reached at any time via a two-way radio or over the public address (**PA**) and plectrons on-site. If the RCRA Emergency Coordinator is unavailable or unable to perform these duties, a qualified alternate RCRA Emergency Coordinator is available.

The EST/FPT is also notified in case of fire, explosion, or release. The RCRA Emergency Coordinator, as incident commander, determines if supplemental emergency responders are necessary. Notification of the ERT (surface) is made by using the ERT pagers and/or the public announcement system. Notification of the FLIRT is by using the Mine Page Phone System. If the MRT is needed the RCRA Emergency Coordinator will instruct the CMRO to make a PA announcement for the MRT to assemble in the Mine Rescue Room, located in a predetermined location.

Off-shift personnel may be notified using the on-call list, which is updated weekly by the Permittees. The FSM/CMRO, each individual on the on-call list, and WIPP Security receive copies of the on-call list. The CMRO may direct Security to make the notifications.

The response to an unplanned event will be performed in accordance with procedures based on the applicable Federal, State, or local regulations and/or guidelines for that response. These include the U.S. Mine Safety and Health Administration (**MSHA**); NMAC; CERCLA; Chapter 74, Article 4B, New Mexico Statutes Annotated 1978, New Mexico Emergency Management Act; and agreements between the Permittees and local authorities (Section F-6) for emergencies throughout the WIPP facility.

After notification by the CMRO, the EST/FPT shall immediately investigate to determine pertinent information relevant to the actual or potential threat posed to human health or the environment. The information will include the location of release, type, and quantity of spilled or released material (or potential for release due to fire, explosion, weather conditions, or other naturally occurring phenomena), source, areal extent, and date and time of release. The EST/FPT shall provide information for classification of the incident, according to the emergency response guidelines, to the RCRA Emergency Coordinator. The RCRA Emergency Coordinator then classifies the incident after evaluation of all pertinent information. This classification will consider both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions).

When the RCRA Emergency Coordinator determines that an Incident Level II or III has occurred, the Contingency Plan is implemented. The RCRA Emergency Coordinator then may choose to activate the EOC for additional support (Figure F-4). If the RCRA Emergency Coordinator determines that due to extenuating circumstances the potential to upgrade to an incident Level II or III exists, the RCRA Emergency Coordinator also may activate the EOC. The EOC will assist the RCRA Emergency Coordinator in mitigation of the incident with use of communications equipment and technical expertise from any WIPP organization (see Section F-4c).

The EOC staff will assess opportunities for coordination and the use of mutual-aid agreements with local outside agencies making additional emergency personnel and equipment available (Section F-6), as well as the use of specialized response teams available through various State and Federal agencies. As a DOE-owned facility, the WIPP facility may use the resources available from the Federal Response Plan, signed by 27 Federal departments and agencies in April 1987, and developed under the authorities of the Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7701 et seq.) and amended by the Stafford Disaster Relief Act of 1988. Most resources are available within 24 hours. The WIPP facility maintains its own emergency response capabilities on-site. In addition to the supplemental emergency responders, radiological control technicians, environmental sampling technicians, wildlife biologists, and various other technical experts are available for use on an as-needed basis.

F-4a(2) Communication of Emergency Conditions to Facility Employees

Procedures for notifying facility personnel of emergencies depend upon the type of emergency. Methods of notification are:

- Local Fire Alarms

  The local fire alarms sound a bell tone and may be activated automatically or manually in the event of a fire.

- Surface Evacuation Signal

  The evacuation signal is a yelp[2] tone and is manually activated by the CMRO when needed. The CMRO shall follow the evacuation signal with verbal instructions and ensure the Site Notification System (i.e., the plectron) has been activated.

[2]The yelp tone increases from 500 to 1,000 hertz and drops to 500 hertz.

- Underground Evacuation Warning System

  The evacuation signal is a yelp tone and flashing strobe light. In the event of an evacuation signal, underground personnel will proceed to the nearest egress hoist station (Section F-7b) to be apprised of the nature of the emergency and the evacuation route to take. Underground personnel are trained to report to the underground assembly areas and await further instruction if all power fails or if ventilation stops. If evacuation of underground personnel is required, this will be done using the backup electric generators and in accordance with the applicable requirements of MSHA.

- Contingency Evacuation Notification

  If the primary warning system consisting of alarms and signals fails to operate when activated (as in a total power outage and failure of the back-up power systems), WIPP Security will be notified by the CMRO to initiate the contingency evacuation plan. In this event Security officers will alert personnel to evacuate the area and will check trailers, if possible, to ensure that personnel have been alerted/evacuated.

WIPP facility personnel are trained and given instruction during General Employee Training to recognize the various alarm signals and the significance of each alarm. WIPP facility employees and site visitors are required to comply with directions from emergency personnel and alarm system notifications and to follow instructions concerning emergency equipment, shutdown procedures, and emergency evacuation routes and exits.

F-4a(3) Notification of Local, State, and Federal Authorities

If it is determined that the facility has had a fire, an explosion, a spill, or a release of hazardous waste or hazardous waste constituents (included in 20.4.1.200 NMAC (incorporating 40 CFR § 261)) in the miscellaneous unit or TRU mixed waste handling areas, or an emergency resulting in a release of a hazardous substance (included in 40 CFR §302.4 and §302.6 or the New Mexico Emergency Management Act, §74-4B-3 and §74-4B-5) that could threaten human health or the environment outside the facility, the RCRA Emergency Coordinator, after consultation with the DOE as the owner of the facility, will assure that local authorities are notified by telephone and/or radio, including:

- Carlsbad Police Department (telephone number: [505] 885-2111) (or 911)
- Carlsbad Fire Department (telephone number: [505] 885-2111) (or 911)
- Eddy County Sheriff (telephone number: [505] 887-7551)
- Hobbs Fire Department (telephone number: [505] 397-9265)

After local authorities are notified, the RCRA Emergency Coordinator will ensure notification of the following:

- New Mexico Environment Department (**NMED**)
  Department of Public Safety
  24-Hour Emergency Reporting Telephone Number: (505) 827-9329
  FAX number: (505) 827-9368

- Department of Public Safety WIPP Coordinator
  Telephone Number: (505) 827-9221
  FAX number: (505) 829-3434

- Hazardous Materials Emergency Response, Chemical Safety Office, Department of Public Safety, State Emergency Response Commission
  Telephone number: (505) 476-9620
  FAX number: (505) 476-9695

- National Response Center
  Telephone number: 1-800-424-8802
  FAX number: (202) 479-7181

- Local Emergency Planning Committee
  Telephone number: (505) 887-9511
  Fax number: (505) 887-1039

The first notification of public safety and regulatory agencies will include the following:

- The name and address of the facility and the name and phone number of the reporter

- The type of incident (fire, explosion, or release)

- The date and time of the incident

- The type and quantity of material(s) involved, to the extent known

- The exact location of the incident

- The source of the incident

- The extent of injuries, if any

- Possible hazards to human health and the environment (air, soil, water, wildlife, etc.) outside the facility

- The name, address, and telephone number of the party in charge of or responsible for the facility or activity associated with the incident

- The name and the phone number of the RCRA Emergency Coordinator

- The identity of any surface and/or groundwater involved or threatened and the extent of actual and potential water pollution

- The steps being taken or proposed to contain and clean up the material involved in the incident

The RCRA Emergency Coordinator will also be available to advise the appropriate local, State, or Federal officials on whether or not local areas should be evacuated.

F-4a(4) Notification of the General Public

Immediate notification of the general public through the public safety and emergency agencies listed above will be made by, or under the direction of, the RCRA Emergency Coordinator following an evaluation to determine if local adjacent areas need to be evacuated. This evaluation will be made in consultation with the DOE who, as the owner of the facility, has management responsibility for the land withdrawal area. DOE policy is to provide accurate and timely information to the public by the most expeditious means possible concerning emergency situations at the WIPP site that may affect off-site personnel, public health and safety, and/or the environment. A DOE Carlsbad Field Office (**DOE/CBFO**) Management representative is always on-call. This person is available by pager or telephone 24 hours a day.

A Hazards Assessment was conducted, which indicated no need for protective actions or emergency action levels, as defined by the Permittees, for the facility. Therefore, no procedures are in place for evacuation of the public. Procedures are in place for notification of the public by radio, television, and newspapers for news items which might include notification of on-site emergency situations. These procedures include a Public Affairs Coordinator in the EOC who writes and transmits press releases to the DOE/CBFO office, where formal press conferences are conducted.

F-4b Identification of Hazardous Materials

The identification of hazardous wastes, hazardous waste constituents, or hazardous materials involved in a fire, an explosion, or a release to the environment is a necessary part of the assessment of an incident, as described in 20.4.1.500 NMAC (incorporating 40 CFR §264.56(b)). RCRA hazardous waste and hazardous substances and materials listed in 40 CFR §302.4 and §302.6 or New Mexico Emergency Management Act, §74-4B-3 and §74-4B-5 and, involved in any release at the WIPP facility will be identified. The identification of likely hazardous materials at any location is enhanced because hazardous materials and hazardous waste are only stored or managed in specified locations throughout the WIPP facility. An attempt will be made to identify products involved by occupancy/location, container shape, markings/color, placards/labels, United Nations/North America/Product Identification Number, on-site technical experts, or field sampling. Further, the ES&H department maintains an updated inventory of hazardous materials/substances that are brought on site, and a master MSDS listing in the Safety and Emergency Services Facility, Building 452.

Sources of information available to identify the hazardous wastes, substances, or materials involved in a fire, an explosion, or a release at the WIPP facility include operator/supervisor knowledge of their work areas, materials used, and work activities underway; the WIPP Waste

Information System (**WWIS**), which identifies the location within the facility of emplaced TRU mixed waste, including emplaced derived waste; and waste manifests and other waste characterization information in the operating record. The WWIS also includes information on wastes that are in the waste handling process. Also available are MSDSs for hazardous material in the various user areas throughout the facility, waste acceptance records, and materials inventories for buildings and operating groups at the WIPP facility. Information or data from the derived waste accumulation areas, the hazardous waste staging area, satellite staging areas, and nonregulated waste accumulation areas are included.

TRU mixed waste received by the WIPP facility during the Disposal Phase will be characterized for hazardous constituents prior to receipt, and acceptable knowledge will be used to characterize derived waste prior to emplacement.

Information required for identifying TRU mixed hazardous constituents in case of an incident is readily available through the WWIS and the waste acceptance records. Waste accepted at WIPP is already known to be compatible with all materials used to respond to an emergency. All non-TRU mixed waste materials received on site, other than those listed in Table F-1, are in such small quantities that no reaction could develop which would trigger an Incident Level II or III response.

The RCRA Emergency Coordinator will have access to the WWIS through Operations, or through the Facility Shift Manager's Office.

The RCRA Emergency Coordinator has access to the inventory lists and MSDSs in the Safety and Emergency Services Facility at all times.

F-4c Assessment of the Nature and Extent of the Emergency

Once the required notifications have been made, the RCRA Emergency Coordinator will ensure that the identity, exact source, amount, and areal extent of any released materials are determined, as required under 20.4.1.500 NMAC (incorporating 40 CFR §264.56(b)). The RCRA Emergency Coordinator will determine whether the occurrence constitutes an emergency based on knowledge of the area and access to the waste identification/characterization information described in Section F-4b. An emergency will require response by only trained emergency response personnel. The RCRA Emergency Coordinator will be responsible for responding to immediate and potential hazards, using the services of trained personnel to determine: 1) the identity of hazardous wastes, hazardous waste constituents, and other hazardous materials involved in a release, as described in Section F-4b; 2) whether or not a release involved a reportable quantity of a hazardous substance; 3) the areal extent of a release; 4) the exact source of a release; and 5) the potential hazards to human health or to the environment.

After the materials involved in an emergency are identified, the specific information on the associated hazards, appropriate personal protective equipment (**PPE**), decontamination, etc., will be obtained from MSDSs and from appropriate chemical reference materials at the same location. These information sources may be accessed by the RCRA Emergency Coordinator or through several WIPP facility organizations.

The emergency assessment requires determination of hazards involving evaluation of several criteria, including:

- Exposure: magnitude of actual or potential exposure to employees, the general public, and the environment; duration of human and environmental exposure; pathways of exposure
- Toxicity: types of adverse health or environmental effects associated with exposures; the relationship between the magnitude of exposure and adverse effects
- Reactivity: hazardous materials or hazardous wastes, which are not TRU mixed wastes, involved in an incident will be assessed for reactivity through accessing the MSDSs for the affected material and the recommended method(s) for managing such waste
- Uncertainties: considerations for undeterminable or future exposures; uncertain or unknown health effects, including future health effects

F-4d Control, Containment, and Correction of the Emergency

The WIPP facility is required to control an emergency and to minimize the potential for the occurrence, recurrence, or spread of releases due to the emergency situation, as described in 20.4.1.500 NMAC (incorporating 40 CFR §264.56 (e)). The WIPP Emergency Response procedures utilize the incident mitigation guidelines in NFPA 471, Responding to Hazardous Materials Incidents, with initial response priority being on control, and those actions necessary to ensure confinement and containment (the first line of defense) in the early, critical stages of a spill or leak. The RCRA Emergency Coordinator is responsible for stopping processes and operations when necessary, and removing or isolating containers. TRU mixed waste will remain within the WHB Unit~~, parked Contact Handled Packages~~ the Parking Area Unit, and the underground HWDU.

F-4d(1) All Emergencies

The WIPP Emergency Response procedures include, but are not limited to, the following actions appropriate for control:

1. Isolate the area from unauthorized person by fences, barricades, warning signs, or other security and site control precautions. Isolation and evacuation distances vary, depending upon the chemical/product, fire, and weather situations.
2. Identify the chemical/product according to Section F-4b.
3. Drainage controls.
4. Stabilization of physical controls (such as dikes or impoundment[s]).
5. Capping of contaminated soils to reduce migration.
6. Using chemicals and other materials to retard the spread of the release or to mitigate its effects.
7. Excavation, consolidation, removal, or disposal of contaminated soils.

8. Removal of drums, barrels, or tanks where it will reduce exposure risk during situations such as fires.

If the facility stops operations in response to a fire, explosion, or release, the RCRA Emergency Coordinator shall ensure continued monitoring for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever appropriate. If operations continue, personnel normally assigned to these tasks will continue.

Both natural and synthetic methods will be employed to limit the releases of hazardous materials so that effective recovery and treatment can be accomplished with minimum additional risk to human health or the environment. A combination of the above methods to achieve protection of human health and the environment, with emphasis on two basic methods for mitigation of hazardous materials incidents - Physical and Chemical (Tables F-4, F-5) mitigation, will be used.

1. Physical methods of control involve any of several processes to reduce the area of the spill/leak, or other release mechanism (such as fire suppression).

   A. Absorption is the process in which materials hold liquids through the process of wetting. Absorption is accompanied by an increase in the volume of the sorbate/sorbent system through the process of swelling. Some of the materials utilized in response to Level I incidents or Level II incidents involving liquids will be absorbent sheets of polyolefin-type fibers, spill control bucket materials (specifically for solvents, neutralization, or for acids/caustics), and absorbent socks for general liquids or oils.

   B. Covering refers to a temporary form of mitigation for radioactive incidents that will be utilized in response to Level II or Level III incidents involving CH TRU mixed waste. These could include absorbent sheets, plastic, or actual ambulance blankets.

   C. Dikes or Diversions refer to the use of physical barriers to prevent or reduce the quantity of liquid flowing into the environment. Dikes may be soil or other barriers temporarily utilized to hold back the spill or leak. Diversion refers to the methods used to physically change the direction of the flow of the liquid. Absorbent socks or earth may be utilized as dikes or diversions for all levels of incidents.

   D. Overpacking is accomplished by the use of an oversized container. Overpack containers will be compatible with the hazards of the materials involved.

   E. Plug and Patch refers to the use of compatible plugs and patches to reduce or temporarily stop the flow of materials from small holes, rips, tears, or gashes in containers. A Series “A” hazardous response kit containing nonsparking equipment to control and plug leaks may be utilized for response to all levels of incidents.

F. Transfer refers to the process of moving a liquid, gas, or some forms of solids, either manually or by pump, from a leaking or damaged container. Scoops, shovels, jugs, and pails as well as drum transfer pumps for chemical and petroleum transfer are utilized as needed in response to all levels of incidents.

G. Vapor Suppression refers to the reduction or elimination of vapors emanating from a spilled or released material through the most efficient method or application of specially designed agents such as an aqueous foam blanket.

2. Chemical Methods of Mitigation

A. Neutralization is the process of applying acids or bases to a spill to form a neutral salt. The application of solids for neutralizing can often result in confinement of the spilled material. This would include using the neutralizing adsorbents.

B. Solidification is the process whereby a hazardous liquid is added to material such as an absorbent so that a solid material results.

The established procedures are based upon the incident level and a graded approach for nonradioactive or CH TRU waste emergencies and initiated to:

1. Minimize contamination or contact (through PPE, etc.)
2. Limit migration of contaminants
3. Properly dispose of contaminated materials

For RH TRU mixed waste, the detection of contamination on a RH TRU mixed waste canister may occur outside the Hot Cell Complex during cask to cask transfer of the canister. Contamination may also be detected within the Hot Cell Complex during the unloading of the CNS 10-160B shipping cask. In either case, the Permittees may decontaminate or return the shipment to the generator/storage site or another site for remediation. Spills or releases that occur within RH Complex or the underground as the result of RH TRU mixed waste handling will be mitigated by using appropriate measures which may include the items above.

F-4d(2) Fire

The incident level emergency response identified in Section F-3 includes fire/explosion potential. WIPP fire response includes incipient, exterior structure fires, and internal structure fires. The RCRA Emergency Coordinator can implement the Memoranda of Understanding (**MOU**) for additional support.

The first option in mine fire response will be to apply mechanical methods to stop fires (e.g., cut electrical power). The last option in mine fire response will be to reconfigure ventilation using control doors associated with the underground ventilation system. The following actions are implemented in the event of a fire:

1. All emergency response personnel at an incident will wear appropriate PPE.

2. Only fire extinguishing materials that are compatible with the materials involved in the fire will be used to extinguish fires. Compatibility with materials involved in a fire are determined by pre-fire plans, Emergency Response Guide Book (DOT, 1993), DOT labeling, and site-specific knowledge of the emergency response personnel. Water and dry chemical materials have been determined to be compatible with all components of the TRU mixed waste. Pre-fire plans for the WHB are included in Figures F-10 and F-11.

   Fires in areas of the WHB Unit should not propagate, due to limited amount of combustibles, and the concrete and steel construction of the structures. Administrative controls, such as landlord inspections and EST/FPT inspections, help to insure good housekeeping is maintained. Combustible material and TRU mixed waste will be isolated, if possible. Firewater drain trenches collect the water and channel it into a sump. In areas not adjacent to the trenches, portable absorbent dikes (pigs) will be used to retain as much as possible, until it can be transferred to containers or sampled and analyzed for hazardous constituents.

3. If the fire spreads or increases in intensity, personnel will be directed to evacuate.

4. The RCRA Emergency Coordinator will remain in contact with responding personnel to advise them of the known hazards.

5. In order to ensure that storm drains and/or sewers do not receive potentially hazardous runoff, dikes will be built around storm drains to control discharge as needed. Collected waste will be sampled and analyzed for hazardous constituents, before being discharged to evaporation ponds. There are two ponds south of the security fence, opposite the WHB Unit, that will collect drainage from the parking area. The rest of the site, inside the security fence, drains to the large pond to the west. Samples will be taken from these ponds, after the emergency has been abated, to determine any cleanup requirements. NMED will approve any procedures associated with the sampling and analysis of the ponds.

6. The RCRA Emergency Coordinator maintains overall control of the emergency and may accept and evaluate the advice of WIPP facility personnel and emergency response organization members, but retains overall responsibility.

7. The RCRA Emergency Coordinator will be in overall control of WIPP facility emergency response efforts until the emergency is terminated.

8. Materials involved in a fire can be identified in the following ways:

   - According to Section F-4b.

   - If the contents of the waste container cannot be determined based on its location and the label is destroyed by fire, the material will be treated as an unknown, evaluated for radiological contamination, and analyzed according to methods in the EPA's "Test Methods for Evaluating Solid Waste Physical/Chemical Methods" (**SW-846**), Third Edition, after the fire has been extinguished.

- Airborne radioactivity samples may be obtained during a fire involving radioactive materials, using portable and fixed air samplers. Response personnel will be adequately protected from airborne radioactivity by their PPE required for fire response.

9. Only materials compatible with the waste may be used for fire response.

10. When cleanup has proceeded to the point of finding no radionuclide activity, then the "swipe" can be sent for analysis for hazardous constituents. The use of these confirmation analyses is as follows:

    - For waste containers, once radiologically clean and free of any visible evidence of hazardous waste spills on the container, it will be placed in the underground without further action.

    - For area contamination, once the area is cleaned up and is shown to be radiologically clean, it will be sampled for the presence of hazardous waste residues (for further information see Section F-4d, Emergency Termination Procedures).

11. Fire suppression materials used in response to incidents will be retained on-scene, where an evaluation will be performed to determine appropriate recovery and disposal methods.

F-4d(3) Explosion

The following actions will be implemented in the event that an explosion that involves or threatens hazardous or TRU mixed waste or hazardous materials has occurred:

1. The area will be evacuated immediately.

2. The CMRO will immediately notify the appropriate emergency response personnel and the RCRA Emergency Coordinator about the explosion.

3. Injured personnel will be treated and transported as necessary.

4. The RCRA Emergency Coordinator will remain in contact with responding personnel to advise them of the known hazards involved and the degree and location of the explosion and associated fires.

5. The RCRA Emergency Coordinator will be in command and may accept and evaluate the advice of WIPP facility personnel and emergency response

organization members, but retains the overall responsibility. Selections of methods and tactics of response are the responsibility of the Incident Commander.

6. The RCRA Emergency Coordinator will be in overall control of WIPP facility emergency response efforts until the emergency is terminated.

7. When cleanup has proceeded to the point of finding no radionuclide activity, then samples may be taken for chemical analysis if there is visible evidence to suspect additional hazardous waste residues. Chemical residues on floor surfaces resulting from a hazardous waste explosion will be evaluated, sampled, analyzed (if required), isolated, and returned to appropriate containers, and surfaces will be cleaned using appropriate cleaners.

8. The RCRA Emergency Coordinator may shut down operational units (e.g., process equipment and ventilation equipment) that have been affected directly or indirectly by the explosion. Once the areas have been determined safe for reentry, processes may be reactivated.

F-4d(4) Spills

Protection of response personnel at a hazardous material incident is paramount. The primary methods to protect personnel are time, distance, and shielding. If a Level II or III incident exists, the RCRA Emergency Coordinator will implement the following actions:

1. The immediate area will be evacuated.

2. The RCRA Emergency Coordinator will review facility records to determine the identity and chemical nature of released material.

3. Entry team procedures will be utilized, with special attention to the following:

    - Buddy system
    - Appropriate PPE
    - Backup rescue team
    - Supplemental communication signals (hand signals and hand-light signals)
    - Monitoring equipment
    - Exposure time limitations

4. If possible, the source of the release will be secured.

5. A dike to contain runoff may be built.

6. Emergency responders will ensure that storm drains and/or sewers do not receive potentially hazardous runoff or spilled material. They may build dikes around storm drains to control discharge.

7. Released wastes may be collected and contained by stabilizing or neutralizing the spilled material, as appropriate, pouring an absorbent over the spilled material, and sweeping or shoveling the absorbed material into drums or other appropriate containers. The absorbents have been determined to be compatible with all components of the TRU mixed waste.

8. No TRU mixed waste that may be incompatible with the released material will be managed in the affected area until cleanup procedures are complete.

9. The RCRA Emergency Coordinator will direct spill control, decontamination, and termination procedures described below.

F-4d(5) Decontamination of Personnel

Decontamination of personnel with radioactive contamination is the responsibility of the Radiological Control (**RC**) section. If a person is contaminated with radioactivity during a site evacuation to the staging areas, the contaminated area will be covered before the person can be moved (under escort by RC personnel) to the staging area. The RC personnel will ensure the contaminated person remains segregated from other site personnel while under RC supervision.

In the event of an emergency that requires immediate evacuation of the area, the contamination can be covered by any method warranted, given the circumstance (e.g., clean clothing wrapped around the area). If the size of the radioactive contamination on the body is small and localized, it can be covered with clothing (e.g., glove, shoe cover, coveralls). If the size of the radioactive contamination on the body is large, it may be covered by dressing the individual in a full set of Anti-Contamination clothing (coveralls, hood, gloves, shoe covers, etc.).

If time and location permit and the contamination is on the face, it will be decontaminated immediately using a cloth moistened with tepid water (and a mild detergent, if necessary). If the size of the radioactive contamination on the individual's body is small and localized, it will be decontaminated using the same method as for the face, but after the individual has been transferred to an area appropriate for conducting decontamination.

If the individual is transferred to the staging area prior to decontamination, he/she will be decontaminated at the staging area using site procedures for personnel decontamination and using decontamination supplies and equipment as appropriate for the extent and magnitude of the contamination.

F-4d(6) Control of Spills or Leaking or Punctured Containers of CH and RH TRU Mixed Waste

In the event of spills or leaking or punctured containers of CH and RH TRU mixed waste, the WIPP responds ~~in~~ to three distinct phases: 1) the event, 2) the re-entry, and 3) the recovery.

~~1.~~ During the event, the following immediate actions are completed: 1) stop work, 2) warn others (notify CMR), 3) isolate the area, 4) minimize exposure, and 5) close off unfiltered ventilation. These actions can take place simultaneously, as long as they are completed before proceeding to the re-entry phase.

CH TRU Mixed Waste

~~2.~~ ~~During~~ Prior to the re-entry ~~phase~~ following an event involving containers of CH TRU mixed waste, a Radiological Work Permit (**RWP**) is written for personnel to enter with protective clothing to assess the conditions, take surveys and samples, and mitigate problems that could compound the hazards in the area (cover up spilled material with plastic material sheeting and or any approved fixatives such as polyvinyl alcohol (**PVA**) or paint, place equipment in a safe configuration, etc.). ~~Smears~~ During the re-entry phase, smears and air sample filters are taken and counted. This information is used by cognizant managers, RC personnel, and As Low As Reasonably Achievable (**ALARA**) Committee representatives to determine an appropriate course of action to recover the area. A plan to decontaminate and recover affected areas and equipment will be approved with a separate RWP written to establish the radiological controls required for the recovery.

~~3.~~ During the recovery phase, the plan will be executed to utilize the necessary resources to conduct decontamination and/or overpacking operations as needed. The completion of this phase will occur prior to returning the affected area and/or equipment to normal activities. The recovery phase will include activities to minimize the spread of contamination to other areas. These activities will involve placing the waste material in another container; vacuuming the waste material; overpacking or plugging/patching the spilled, leaking, or punctured waste container; and/or decontaminating the affected area(s). If an affected surface cannot be decontaminated to releasable levels, it may be covered with a fixative coating and established as a Fixed Contamination Area to prevent spread of contamination, or it may be removed using heavy machinery and tools, packaged in approved waste containers, and emplaced in the underground. Every reasonable effort to minimize the amount of derived waste, while providing for the health and safety of personnel, will be made.

Should a breach of a CH TRU mixed waste container occur at the WIPP that results in ~~external~~ removable contamination exceeding the small area "spot" decontamination levels, the affected container(s) (e.g., breached and contaminated) will be placed into an available overpack container (e.g., 85-gal drum, SWB, TDOP), except that TDOP's will be decontaminated, repaired/patched in accordance with 49 CFR §173 and §178 (e.g., 49 CFR §173.28), or returned to the generator. The decontamination of equipment and the overpacking of contaminated/damaged waste containers will be performed in the vicinity of the incident. For example, under normal operations CH TRU mixed waste will be handled only in the areas of the WHB Unit. Therefore, it is within these same areas that decontamination and/or overpacking operations would occur. By eliminating the transport of contaminated equipment to other areas for decontamination or overpacking, the risk of spreading contamination is reduced.

Equipment used during a spill cleanup or CH TRU mixed waste overpacking operation could include: cloths, brushes, scoops, absorbents, squeegees, tape, bags, pails, slings, hand tools, and others as needed for a given incident.

~~   ~~At the underground emplacement room, salt contaminated by a spill of CH TRU mixed waste would be either covered or cleaned up, depending on location, extent, and spilled material, due to potential radioactive contamination spread via the salt dust. The contaminated salt would be covered to isolate it from the workers, and the stacking of waste containers would resume or would be removed and packaged as site-derived waste using applicable site procedures for decontaminating surfaces.

The decontamination methods will initially involve wiping down structures, equipment, and other containers in the area with absorbent cloths moistened with tepid water. Surveys of these structures will take place and the need to continue decontamination activities will be established. If further decontamination is required, nonhazardous decontaminating agents, such as Liquinox©, Simple Green©, Windex©, citric acid, Bartlett Strip Coat©, and high pressure CO_2 will be used to prevent generating CH TRU mixed waste.

RWPs and other administrative controls provide protective measures to help ensure that new hazardous constituents will not be added during decontamination activities.

Certain structures and/or equipment may be disassembled to facilitate decontamination or may be placed directly into a derived waste container. Items used in the spill cleanup and decontamination operations (e.g., swipes, tools, PPE, etc.) may also be placed into a derived waste container.

When decontamination is deemed by the recovery team to be complete, RC personnel will conduct one final, intensive radcon survey of the area and components in the area to release it for uncontrolled use. The free release criteria for items, equipment, and areas is < 20 dpm/100 cm^2 for alpha radioactivity and < 200 dpm/100 cm^2 for beta-gamma radioactivity. Personnel will then perform hazardous material sampling after decontamination efforts are complete to ~~confirm~~ verify the removal of hazardous waste substances. After cleanup is complete, facility personnel will complete an inspection and include the details of the spill and cleanup in the log.

RH TRU Mixed Waste

For RH TRU mixed waste, the detection of contamination on a RH TRU mixed waste canister may occur outside the Hot Cell Complex during cask to cask transfer of the canister. Contamination may also be detected within the Hot Cell Complex during the unloading of the CNS 10-160B shipping cask. In either case, the Permittees may decontaminate or return the shipment to the generator/storage site or another site for remediation. Spills or releases that occur within RH Complex or the underground as the result of RH TRU mixed waste handling will be mitigated by using the following measures, as appropriate:

During the re-entry phase, an evaluation of the incident, including the nature of the release, amount, location, and other appropriate factors, will be performed. A RWP will be written and approved prior to personnel entering the Hot Cell Complex with the appropriate PPE to further assess the situation, perform surveys and take samples, and, if possible, mitigate problems that could compound the hazards in the area. Based on the results of the evaluation, a determination will be made by the RCRA Emergency Coordinator, with input from the cognizant managers radiological control personnel, and As Low As Reasonably Achievable Committee representatives whether to implement the Contingency Plan and to determine the appropriate course of action to recover from the event. An action response plan to decontaminate and recover affected areas and equipment, together with an RWP establishing the radiological controls required for the recovery will be developed and approved.

Should a breach of a RH TRU mixed waste container occur in the Hot Cell Complex that results in removable contamination exceeding the small area "spot" decontamination levels, the affected container(s) (e.g., breached and contaminated) will be placed into an available container and processed for disposal. The decontamination of equipment, cleanup of spilled material and the overpacking of contaminated/damaged waste containers will be performed in the vicinity of the incident. For example, under normal operations RH TRU mixed waste in 55-gallon drums will be handled only in the Hot Cell Complex. Therefore, it is within this area that decontamination and/or overpacking operations would occur. By eliminating the transport of contaminated equipment to other areas for decontamination or overpacking, the risk of spreading contamination is reduced. Contaminated materials for the cleanup and overpacking of a breached RH TRU mixed waste container may be managed as CH TRU mixed waste, depending on the surface dose rate.

Equipment used during a spill cleanup or RH TRU mixed waste overpacking operation could include: cloths, brushes, scoops, absorbents, squeegees, tape, bags, pails, slings, hand tools, and other equipment as needed for a given incident.

The decontamination methods may initially involve wiping down structures, equipment, and other containers in the area with absorbent cloths moistened with tepid water. Surveys of these structures will take place and the need to continue decontamination activities will be established. If further decontamination is required, nonhazardous decontaminating agents, such as Liquinox©, Simple Green©, Windex©, citric acid, Bartlett Strip Coat©, and high pressure CO_2 will be used to prevent generating CH TRU mixed waste.

RWPs and other administrative controls provide protective measures to help ensure that new hazardous constituents will not be added during decontamination activities.

Certain structures and/or equipment within the Hot Cell Complex may be disassembled to facilitate decontamination or may be placed directly into a derived waste container.Items used in the spill cleanup and decontamination operations (e.g., swipes, tools, PPE, etc.) may also be placed into a derived waste container.

When decontamination of the Hot Cell Complex is deemed by the recovery team to be complete, RC personnel will conduct one final, intensive radcon survey of the area and components in the area to release it for continued use. Personnel will then perform hazardous material sampling after decontamination efforts are complete to confirm the removal of hazardous waste substances. After cleanup is complete, facility personnel will complete an inspection and include the details of the spill and cleanup in the log. The recovery phase must be completed before the affected area and/or equipment are returned to service.

F-4d(7) Natural Emergencies

After a natural emergency (earthquake, flood, lightning strike, etc.) that involves hazardous waste or hazardous materials, the FSM will ensure the following actions are taken:

1. Inspect containers which have not been disposed and containment for signs of leakage or damage. Inspect areas where containers are stored looking for leaking containers and for deterioration of containers and the containment system.

2. Inspect affected equipment or areas associated with hazardous waste management activities for proper operating mode in accordance with site procedures and manually check to ensure automatic and alarmed features on the units are working.

3. Inspect affected equipment or areas within the HWMUs in accordance with site procedures for damage.

4. Inspect electrical boards and overhead electrical lines for damage.

5. Check container areas for signs of leakage or damage to drums and containers.

6. Check affected buildings and fencing directly related to hazardous waste management activities for damage.

7. Conduct a general survey of the site looking for signs of land movement, etc.

8. Take any necessary corrective measures, however temporary, to rectify potential or real problems.

9. Record inspection results.

F-4d(8) Roof Fall

Roof fall is not expected to affect RH TRU mixed waste because it is emplaced in the rib of the disposal room and not subject to impact from a roof fall. The following incident description and mitigation apply to CH TRU mixed waste.

The WIPP underground is routinely evaluated for stability and safety of the underground openings. These evaluations can be as simple as the MSHA required visual checks by personnel working in the area or as extensive as the expert review of the roof support system for Room 1 Panel 1 conducted in 1991. An in-depth evaluation of all of the accessible underground is performed on an annual basis as part of the formal ground control operating plans. Weekly visual and sounding inspections are performed by the Permittees. More frequent inspections and evaluations are performed in areas where roof or ribs are in need of evaluations, based on visual observations, analysis of rock deformation data, excavation effects program data acquired from observation holes, and support system performance.

This process applies not only to the waste disposal rooms but to the entire WIPP underground. Prior to waste emplacement, stability of each room will be evaluated. This evaluation will concentrate on the age and current performance of the installed support systems (if any) and the rate of roof beam expansion based on data from installed instrumentation. The roof support system's performance and surety, to provide the support necessary for the required time will be addressed. Criteria used will include design parameters such as the amount of load, the deformation of the installed system, and the number and type of component failures observed, if any. Geotechnical criteria will include parameters such as the type and quantity of fracturing, roof beam expansion rates, and future ground performance based on a predictive model.

Should the evaluation results indicate that remedial actions are necessary prior to placement of waste, experiences at the WIPP indicate that rebolting or installing supplemental support can extend the safe life of a room for several years.

After waste emplacement commences, geomechanical monitoring will continue with monitors that are tied into a computer network program. The readings obtained will provide information needed for the roof beam stability assessment. Visual observations of the ground and the support systems will also continue in all accessible areas. Based on the experiences from the Site and Preliminary Design Validation test rooms, it has been proven that any developing instability will be detected through monitoring. Multiple measures to deal with the observed conditions can be implemented months before an event to mitigate any risk associated with a roof fall in the storage room or any affected area within the mine. At a minimum, the affected area will be isolated and withdrawn from ventilation flow. Isolation operations will utilize current available methods, materials, and equipment.

Ground control conditions which could result in a fall can be divided into two scenarios: The first consists of spalling (falling) of individual small and localized rock falling on waste containers.

By definition, they can be considered insignificant as no damage to the drums can occur. The second consists of an entire section of roof falling on multiple stacks of waste containers. Each of these scenarios is discussed below.

<u>Spalling-of-Ground Scenario</u>

The maximum distance between the room roof and a container of waste is 10 ft. Waste containers are designed to withstand impact loads of at least 1,000 pounds (lbs) dropped from a height of 6 ft. flat or 450 lbs dropped on a circumferential edge from a height of 4 ft. Both of which correspond to an allowable impact stress of 25,450 pounds per square inch (psi). Rocks from spalling are small and would not be of sufficient weight when striking a drum from a 10 ft vertical height to cause an impact stress of more than 25,450 psi. Taking into account the falling distance, average weight, and the typical shape of the salt rock, the conclusion is that puncturing a drum by spalling is non-credible.

Fall-of-Ground Scenario

Fall-of-ground occurs when a large section of roof beam falls onto the waste containers. As previously discussed, the possibility of this occurring in an active room is remote, due to continuous monitoring and engineered roof support systems.

The following actions have been developed and will be taken by the RCRA Emergency Coordinator should a rock fall occur in an active waste emplacement area of the repository:

Spalling-of-Ground Actions

1. Determine whether the roof conditions allow for safe entry and if the waste container or containers in question are accessible.

   The process used to determine if a roof condition of a room will allow for safe entry is the same as the ground control inspection process used for inspection of the ground conditions and roof bolt integrity. The inspection will begin at a safe and sound roof starting point and consist of visual inspections of roof bolts, roof, and rib areas for missing or damaged bolts; deformed roof bolt plates; or roof and rib cracks, fractures, or separations. If during the visual inspection suspicious roof bolts, roof, or ribs are found, then operators will proceed with sounding the area in question with a scaling bar for loose roof bolts, bad roof, or ribs (loose roof bolts will not ring when sounded). Bad roof or ribs will have a drummy, hollow, or un-solid sound when struck with the scaling bar. When this operation is performed, a safe avenue for retreat is always maintained. Also maintained is a position such that an unexpected event will not place personnel in a position where the scaling bar or material being scaled could fall on personnel. If the inspection reveals ground that cannot be safely scaled manually or with the available mining equipment, the affected area, up to and including the entire room, will be barricaded and removed from ventilation flow.

   The criteria used to determine whether a waste container is accessible is based on the location of the container, the amount of waste in the room, and the expense of reaching the waste container safely versus the expense of abandonment of the room. For example, if the room is 95% filled and spalling-of-ground punctured a waste container at or near the exit of the room, the decision to isolate the room and move waste emplacement activities to the next room would be prudent.

2. Restrict access in ventilation flow path downstream of the incident.

3. Restrict ventilation to the affected room to ensure that there is no spread of contamination that may have been released. Survey for contamination and establish the boundaries.

4. Inspect accessible and affected containers and containment for signs of leakage or damage.

5. Cover the spill area with material such as plastic or fabric sheets or PVA, in a way that would safely isolate the area.

6. Determine if the covered spill area safely allows for continued waste disposal operations or whether further cleanup is required. If further cleanup is required, provide with cleanup methods described below. Note: Cleaning may not be required since this is the permitted disposal area.

7. Inspect any affected equipment (vehicles, handling equipment, and communication and alarm equipment) for proper function.

8. Repackage spilled waste and repackage, plug, or patch breached waste containers into 55 or 85-gallon drums, SWBs, or TDOPs, depending on volume. Temporarily locate overpack waste containers in an adjacent room. Remove only those intact waste containers necessary to clear the area for decontamination.

9. At the underground emplacement room, salt contaminated by a spill of TRU mixed waste will be covered with materials such as salt, plastic or fabric sheets or PVA to isolate it from the workers or removed and packaged as site derived waste in accordance with site procedures for decontaminating surfaces.

10. Manage the radioactive debris as derived waste.

11. Characterize containers of waste based on the waste containers that were damaged.

12. Replace the removed and derived waste containers into the waste stack as appropriate and update the WWIS.

13. Document activities and record results.

<u>Fall-of-Ground Actions</u>

1. Restrict access in ventilation flow path downstream of the incident.

2. Restrict the room from ventilation flow by closing bulkhead regulators.
3. Survey for radiological contamination and establish the boundary for a Radiological Buffer Area.

4. Install barricade devices to remove access.

5. At the underground emplacement room, salt contaminated by a spill of TRU mixed waste will be covered with materials such as salt, plastic or fabric sheets, or PVA to isolate it from the worker or removed and packaged as site derived waste using damp rags, hand tools, and HEPA filtered vacuums.

   The criteria used to determine whether to close the entire panel or just the affected room of waste containers would include the location of the roof fall and the stability of the unaffected roof area in the panel. Techniques to determine the stability would be the same as previously described in this section.

F-4d(9) Structural Integrity Emergencies

In the event of a WIPP facility emergency involving underground structural integrity, the situation will be handled as a natural emergency. Monitoring and inspection procedures ensure the safety and integrity of the WIPP facility underground.

F-4d(10) Emergency Termination Procedures

For the transition from emergency phase to cleanup phase, the following items will be complete:

- Emergency scene will be stable
- Release of hazardous substance will be stopped
- Reaction of hazardous substance will be controlled
- The released hazardous substance will be contained within a localized and manageable area
- The area of contamination will be adequately secure from unauthorized entry

At every incident involving hazardous materials, there is a possibility that response personnel and their equipment will become contaminated. Emergency response personnel have procedures to minimize contamination or contact, and to properly dispose of contaminated materials.

For nonemergencies and Incident Level I emergencies, the following methods of decontamination are available for personnel, environment, and/or equipment according to emergency response procedures:

- Absorption
- Adsorption
- Chemical degradation
- Dilution
- Disposal
- Isolation
- Neutralization
- Solidification

Any necessary verification of air, soil, or water samples will be directed by the RCRA Emergency Coordinator. Immediately after an emergency, the RCRA Emergency Coordinator will provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility in accordance with standard operating procedures.

For Level II and III incidents after the emergency itself is controlled and contained, the RCRA Emergency Coordinator will be responsible for the development and implementation of an incident-specific decontamination plan.

PPE will be decontaminated or disposed according to procedure before it is returned to its storage location.

As part of the facility's defense-in-depth approach, equipment will be assumed to be contaminated after each hazardous material response and a thorough check for radioactive contamination will be conducted. If contamination is found, a technically sound decontamination process will be followed. Many types of equipment are difficult to decontaminate and may have to be discarded as hazardous or derived waste. Whenever possible, pieces of equipment will be disposable or made of nonporous material.

If radioactive contamination is detected on equipment or on structures, it will be assumed that hazardous constituents may also be present. Radiological surveys to determine whether a potential release of hazardous constituents has occurred (Permit Attachment I3) will be used along with other techniques as a detection method to determine when decontamination is required. Radiological cleanup standards will be used to determine the effectiveness of decontamination efforts. To provide verification of the effectiveness of the removal of hazardous waste constituents, once a contaminated surface is demonstrated to be radiologically clean, the "swipe" can be sent for analysis for hazardous constituents. The use of these confirmation analyses is as follows:

> For waste containers, the analyses become documentation of the condition of the container at the time of emplacement. These containers will be placed in the underground without further action, once the radiological contamination is removed, unless there is visible evidence of hazardous waste spills or hazardous waste on the container and this contamination is considered likely to be released prior to emplacement in the underground. In no case shall these containers contain a total liquid content equal to, or which exceeds, one volume percent of the container.

> For area contamination, once the area is cleaned up and is shown to be radiologically clean, it will be sampled for the presence of hazardous waste residues. If the area is large, a sampling plan will be developed. The sampling plan will be approved by the NMED before it is implemented. If the area is small, swipes will be used. If the results of the analysis show that residual contamination remains, a decision will be made whether further cleaning will be beneficial or whether final clean up will be deferred until closure. Appropriate notations will be entered into the operating record to assure proper consideration of formerly contaminated areas at the time of closure. Furthermore, measures such as covering, barricading, and/or placarding will be used as needed to mark areas that remain contaminated.

For all Contingency Plan emergency responses, the RCRA Emergency Coordinator will ensure, in keeping with standard operating procedures, that, in the affected area(s) of the facility:

- No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed
- All emergency equipment listed in the ~~c~~Contingency ~~p~~Plan is cleaned and fit for its intended use, or replaced before operations are resumed

F-4e Prevention of Recurrence or Spread of Fires, Explosions, or Releases

During an emergency, the RCRA Emergency Coordinator will ensure that reasonable measures are taken so that fires, explosions, and releases do not occur, recur, or spread to TRU mixed waste or other hazardous materials at the facility, as required under 20.4.1.500 NMAC (incorporating 40 CFR §§264.56(e) and (f)). These measures include:

- Stopping processes and operations.
- Collecting and containing released wastes and materials.
- Removing or isolating containers of waste or hazardous substances posing a threat.
- Ensuring that wastes managed during an emergency are handled, stored, or treated with due consideration for compatibility with other wastes and materials on site and with containers utilized (Section F-4h).
- Restricting personnel not needed for response activities from the scene of the incident.
- Evacuating the area.
- Curtailing nonessential activities in the area.
- Conducting preliminary inspections of adjacent facilities and equipment to assess damage.
- Overpacking and/or removing damaged containers/drums from affected areas. Damaged equipment and facilities will be repaired as appropriate.
- Constructing, monitoring, and reinforcing temporary dikes as needed.
- Maintaining fire equipment on standby at the incident site in cases where ignitable liquids have been or may be released and ensuring that all ignition sources are kept out of the area. Ignitable liquids will be segregated, contained, confined, diluted, or otherwise controlled to preclude inadvertent explosion or detonation.

No operation that has been shut down in response to the incident will be restarted until authorized by the RCRA Emergency Coordinator. Sections F-4g, Incompatible Waste, and F-4h, Post-Emergency Facility and Equipment Maintenance and Reporting, address specific issues related to decreasing the possibility of a recurrence or spread of a release, a fire, or an explosion.

After resolution of the incident, a Root Cause Analysis will be conducted to review all Level II and Level III incidents for determination of cause, and the corrective action plan to prevent recurrence.

F-4f Management and Containment of Released Material and Waste

Once initial release or spill containment has been completed, the RCRA Emergency Coordinator will ensure that recovered hazardous materials and waste are properly stored and/or disposed, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.56(g)). For spills of liquid, the perimeter of the spill will be diked with an absorbent material that is compatible with the material(s) released. Free-standing liquid will be transferred to a marked compatible container. The remaining liquid will be absorbed with an absorbent material and swept or scooped into a marked compatible container. Spill residue will be removed. Spills of dry material will be swept or shoveled into a labeled compatible recovery container. Material recovered from the spill will be transferred to clean containers or tanks or to containers or tanks that have held a compatible material. All containers will meet DOT specifications for shipping the wastes, and materials will be recovered.

Nonradioactive hazardous waste resulting from the cleanup of a fire, an explosion, or a release involving a nonradioactive hazardous waste or hazardous substance at the WIPP facility will be contained and managed as a hazardous waste until such time as the waste is disposed of, or determined to be nonhazardous, as defined in 20.4.1.200 NMAC (incorporating 40 CFR §261) Subparts C and D. In most cases, hazardous materials inventories for the various buildings and areas at the facility will allow a determination of the hazardous materials present in any cleanup of a release or of the residues from an emergency condition. (The quantities of such spills are so small, it is not likely to trigger an Incident Level II or III.) When necessary samples of the waste will be collected and analyzed to determine the presence of any hazardous characteristics and/or hazardous waste constituents; this information is needed to evaluate disposal options. EPA-approved sampling and analytical methods will be utilized. Hazardous wastes will be transferred to the Hazardous Waste Staging Area. The staging area is used to store hazardous waste awaiting transfer to an off-site treatment or disposal facility in accordance with applicable regulations (e.g., 20.4.1 NMAC and DOT regulations). The Hazardous Waste Staging Area for nonradioactive hazardous waste is Buildings 474A and 474B, as shown in Figure F-1. Nonradioactive hazardous wastes will be shipped off-site for disposal at a RCRA permitted disposal facility.

Under normal operations, administrative controls will be implemented to ensure that hazardous materials and incompatible materials will not be introduced to the radioactive materials area during TRU mixed waste handling operations. Examples of administrative controls include restricting the waste received in the TRU mixed waste management area(s) to TRU mixed waste properly manifested from the generator sites and ensuring that materials used in these area(s) are restricted to only those that have previously been determined to be compatible with the TRU mixed waste. The RCRA Emergency Coordinator will have access to building design information and information on specific equipment used within an area upon which to base a determination of the compatibility of materials with the area. If necessary, the RCRA Emergency Coordinator will use EPA-600/2-80-076, "A Method for Determining the Compatibility of Hazardous Waste," (EPA, 1980) for making compatibility determinations. Waste resulting from the cleanup of a fire, explosion, or release in the miscellaneous unit, ~~and~~ the CH TRU mixed waste handling areas, or the RH Complex will be considered derived from the received TRU mixed waste and ~~will~~ may be treated and managed as CH TRU mixed waste depending on the surface dose rate.

In the event of a prolonged cessation of TRU mixed waste handling operations, TRU mixed waste can be placed in areas of the WHB Unit that are available for such contingencies. These areas and the TRU mixed waste containers in them would be located so that adequate aisle space would be maintained for unobstructed movement of personnel and equipment in an emergency. Permit Attachments M, M1, and M2 describe the HWMUs in detail, including the facility description, support structures and equipment, security, waste handling areas, ventilation, and fire protection.

The contaminated area will be decontaminated. If a release is to a permeable surface, such as soil, asphalt, concrete, or other surface, the surface material will be removed and placed in containers meeting applicable DOT requirements. Contaminated soil, asphalt, concrete, or other surface material, as well as materials used in the cleanup (e.g., rags and absorbent material) will be contained and disposed of in the same manner as dictated for the contaminant. Clean soil, new asphalt, or new concrete will be emplaced at the spill location.

If a spill occurs on an impermeable surface, the surface will be decontaminated with water and/or a detergent. In the event that the spilled material is water reactive, a compatible nonhazardous cleaning solution will be used. Contaminated wash water or cleaning solution will be transferred to an appropriate container, marked, and managed as described above for nonradioactive or radioactive liquid wastes.

In the event of a hazardous material or hazardous waste release, the RCRA Emergency Coordinator will ensure that no wastes will be received or disposed of in the affected areas until cleanup operations have been completed. This is to ensure that incompatible waste will not be present in the vicinity of the release.

Because of the restrictions which the WIPP facility places on generators, and because of control of WIPP operations, TRU mixed wastes and derived wastes will not contain any incompatible wastes. However, the areas established for the temporary holding of nonradioactive waste routinely generated at the WIPP facility is divided into bays to accommodate the management of wastes that may be incompatible. If waste is generated as the result of a spill or release of hazardous materials or nonradioactive hazardous waste, the waste generated as a result of abatement and cleanup will be evaluated to determine its compatibility with other wastes being managed in the temporary holding areas. The evaluation will be by identifying the material or waste that was spilled or released and determining its characteristics (e.g., ignitable, reactive, corrosive, or toxic). The waste generated by the abatement and cleanup activities will be stored in that part of the temporary holding area that has been established to manage wastes with which it is compatible.

For small nonemergency liquid spills (e.g., a detergent solution leaking out of the pump handle during decontamination, a spill of hydraulic fluid while servicing a vehicle), spill control procedures will be used to contain and absorb free-standing liquid. The contaminated absorbent will be swept or shoveled into a compatible container and managed as described above. No notifications will be required, but site procedures require documentation of the incident.

F-4g Incompatible Waste

Implementation of the TSDF-WAC for the WIPP ensures that incompatible TRU mixed waste will not be shipped to the WIPP facility. Nonradioactive waste at the WIPP facility will be carefully segregated during handling and holding and will be transported within and off the facility. The RCRA Emergency Coordinator will not allow hazardous or TRU mixed waste operations to resume in a building or area in which incompatible materials have been released prior to completion of necessary post-emergency cleanup operations to remove potentially incompatible materials. In making the determination of compatibility, the RCRA Emergency Coordinator will have available the resources and information described in Section F-4b, Identification of Hazardous Materials. In addition, ES&H department personnel will be available for consultation. Finally, the RCRA Emergency Coordinator may use EPA-600/2-80-076, (EPA, 1980).

F-4h Post-Emergency Facility and Equipment Maintenance and Reporting

The RCRA Emergency Coordinator will ensure that emergency equipment that is located or used in the affected area(s) of the facility and listed in the Contingency Plan is cleaned and ready for its intended use before operations are resumed, as specified in 20.4.1.500 NMAC (incorporating 40 CFR §264.56(h)(2)). Any equipment that cannot be decontaminated will be discarded as waste (e.g., hazardous, mixed, solid), as appropriate. The WIPP facility is committed to replacing any needed equipment or supplies that cannot be reused following an emergency. After the equipment has been cleaned, repaired, or replaced, a post-emergency facility and equipment inspection will be performed, and the results will be documented.

Cleaning and decontaminating equipment will be accomplished by physically removing gross or solid residue; rinsing with water or another suitable liquid, if required; and/or washing with detergent and water. Decontamination and cleaning will be conducted in a confined area, such as a wash pad or building equipped with a floor drain and sump isolated from the environment. Care will be taken to prevent wind dispersion of particles and spray. Liquid or particulate resulting from cleaning and decontamination of equipment will be placed in clean, compatible containers. Waste produced in an emergency cleanup in the TRU mixed waste handling areas is derived waste and will be emplaced in the underground derived waste emplacement area. Waste resulting from decontamination operations elsewhere in the WIPP facility will be analyzed for hazardous waste constituents and/or hazardous waste characteristics to ensure proper management.

When the WIPP facility has completed post-emergency cleanup of waste and hazardous residues from areas where waste management operations are ready to resume and the RCRA Emergency Coordinator has ensured that emergency equipment used in managing the emergency has been cleaned or replaced and is fit for service, the notifications will be made by the Permittees to the following: the EPA Region VI Administrator; the Secretary of the NMED;

and any relevant local authorities. This post-emergency notification complies with 20.4.1.500 NMAC (incorporating 40 CFR §264.56(i)), and is the responsibility of the RCRA Emergency Coordinator.

F-4i Container Spills and Leakage

The waste received at the WIPP facility will meet stringent TSDF-WAC (e.g., no free liquids and less than one percent residual liquids), which will minimize the possibility of waste container degradation and liquid spills. Should a spill or release occur from a container, following an initial assessment of the event, the WIPP facility will immediately take the following actions, in compliance with 20.4.1.500 NMAC (incorporating 40 CFR §264.52(a) and §264.171):

- Assemble the required response equipment, such as protective clothing and gear, heavy equipment, empty drums, overpack drums, and hand tools
- Transfer the released material to a container that is in good condition or overpack the leaking container into another container that is in good condition
- Once the release has been contained, determine the areal extent of migration of the release and proceed with appropriate cleanup action, such as chemical neutralization, vacuuming, or excavation

F-4j Tank Spills and Leakage

The TRU mixed waste handling areas at the WIPP facility do not include tank storage or treatment of hazardous waste, as defined in 20.4.1.101 NMAC (incorporating 40 CFR §260.10), and as regulated under 20.4.1.500 NMAC (incorporating 40 CFR §264) Subpart J. At the WIPP facility, tanks are used to store water and petroleum fuels only. The petroleum tanks store diesel and unleaded gasoline.

F-4k Surface Impoundment Spills and Leakage

The WIPP facility does not manage hazardous or TRU mixed waste using a surface impoundment, as defined in 20.4.1.101 NMAC (incorporating 40 CFR §260.10), and as regulated under 20.4.1.500 NMAC (incorporating 40 CFR, §264) Subpart K. Surface impoundment regulations are not applicable to the WIPP facility.

F-5 Emergency Equipment

A variety of equipment is available at the facility for emergency response, containment, and cleanup operations in both the HWMUs and the facility in general. This includes equipment for spill control, fire control, personnel protection, monitoring, first aid and medical attention, communications, and alarms. This equipment is immediately available to emergency response personnel. A listing of major emergency equipment available at the WIPP facility, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.52(e)), is shown in Table F-6. Table F-7 identifies the locations where fire suppression systems are provided. Locations of the underground emergency equipment are shown in Figure F-5. The firewater-distribution system map is shown in Figure F-6. The underground fuel area fire-protection system is shown in Figure F-7.

F-6 Coordination Agreements

The Permittees have established MOUs with off-site emergency response agencies for firefighting, medical assistance, hazardous materials response, and law enforcement. In the event that on-site response resources are unable to provide all the needed response actions during either a medical, fire, hazardous materials, or security emergency, the RCRA Emergency Coordinator will notify appropriate off-site response agencies and request assistance. Once on site, off-site emergency response agency personnel will be under the direction of the RCRA Emergency Coordinator.

The MOUs with off-site cooperating agencies are available from the Permittees. A listing and description of the MOUs with state and local agencies and mining operations in the vicinity of the WIPP facility, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.37 and §264.52(c)), are:

- An agreement among the Permittees, Mississippi Potash Inc. and IMC Kalium provides for the mutual aid and assistance, in the form of MRTs, in the event of a mine disaster or other circumstance at either of the two facilities. This provision ensures that the WIPP MOC will have two MRTs available at all times when miners are underground.

- A joint powers agreement among the DOE; the City of Carlsbad, New Mexico; Eddy County, New Mexico; and the New Mexico Energy, Minerals, and Natural Resources Department provides for the coordination of emergency plans, including the DOE emergency radiological response plans; provides for participation in periodic exercises, drills, and training; and assigns responsibilities to the participants.

- A memorandum of agreement between the City of Carlsbad, New Mexico, and the WIPP MOC for ambulance service assistance provides that, upon notification by the WIPP MOC, the Carlsbad Fire Department will be dispatched from Carlsbad toward the WIPP site by a designated route and will accept the transfer of patient(s) being transported by the WIPP facility ambulance at the point both ambulances meet. If the patient(s) is not transferrable, the Carlsbad Ambulance Service will provide equipment and personnel to the WIPP facility ambulance, as necessary.

- A MOU between the DOE and the Carlsbad Medical Center Emergency Radiological Treatment Center for the Waste Isolation Pilot Plant provides for the treatment of radiologically contaminated personnel who have incurred injuries beyond the treatment capabilities at the WIPP facility. The DOE will provide transport of the patient(s) to the Carlsbad Medical Center Emergency Radiological Treatment Center for decontamination and medical treatment.

- A MOU between the DOE and the Lea Regional Hospital Emergency Radiological Treatment Center for the WIPP provides for the treatment of radiologically contaminated personnel who have incurred injuries beyond the treatment capabilities at the WIPP facility. The DOE will provide transport of the patient(s) to the Lea Regional Hospital Emergency Radiological Treatment Center for decontamination and medical treatment.

- A MOU between the DOE and the U.S. Department of Interior (**DOI**), represented by the Bureau of Land Management (**BLM**), Roswell District, provides for a fire-management program that will ensure a timely, well-coordinated, and cost-effective response to suppress wild fire within the withdrawal area using the WIPP incident commander for fire-management activities. The DOI will provide firefighting support if requested. In addition, the MOU provides for responsibilities concerning cultural resources, grazing, wildlife, mining, gas and oil production, realty/lands/rights-of-way, and reclamation.

- A mutual-aid firefighting agreement between the Eddy County Commission and the DOE provides for the assistance of the Otis and Joel Fire Departments (a volunteer fire district created under the Eddy County Commission and the New Mexico State Fire Marshall's Office), including equipment and personnel, at any location within the WIPP Fire Protection Area upon request by an authorized representative of the WIPP Project. These responsibilities are reciprocal.

- A mutual-aid agreement between the City of Hobbs and the DOE provides for mutual ambulance, medical, fire, rescue, and hazardous material response services; provides for joint annual exercises; provides for use of WIPP facility radio frequencies by the City of Hobbs during emergencies; and provides for mutual security and law enforcement services, within the appropriate jurisdiction limits of each party.

- A mutual-aid agreement between the City of Carlsbad and the DOE provides for mutual ambulance, medical, fire, rescue, and hazardous material response services; provides for joint annual exercises; provides for use of WIPP facility radio frequencies by the City of Carlsbad during emergencies; and provides for mutual security and law enforcement services, within the appropriate jurisdiction limits of each party.

- A MOU between the DOE and the New Mexico Department of Public Safety (**DPS**) concerning Mutual Assistance and Emergency Management applies to any actual or potential emergency or incident that: 1) involves a significant threat to employees of the Permittees or general public; 2) involves property under the control or jurisdiction of either the DOE or the State; 3) involves a threat to the environment which is reportable to an off-site agency; 4) requires the combined resources of the DOE and the state; 5) requires a resource that the DOE has which the State does not have, or a resource the State has which DOE does not have; or 6) involves any other incident for which a joint determination has been made by the DOE and the State that the provisions of this MOU will apply. The MOU provides that the DPS shall permit qualified and security cleared DOE

Emergency Management members into the State EOC for the purpose of: a) coordinating communications functions; b) evaluating and maintaining communications capabilities; c) participating in exercises; d) link the State's High Frequency radio communications network with the DOE; and e) assisting the State during radioactive materials accidents that require joint operations or the use of the DOE Radiological Assistance Program team. The DOE shall permit qualified and security cleared members the State Emergency Management community into the DOE's EOCs for the purposes of coordinating communications and activities. Additional duties for each participant are specified for assistance in incidents or emergencies.

F-7 Evacuation Plan

If it becomes necessary to evacuate the WIPP facility, the assigned on-site and off-site staging areas have been established. The off-site staging areas are outside the security fence. The WIPP facility has implementation procedures for both surface and underground evacuations. Drills are performed on these procedures at the WIPP facility at least once annually. The following sections describe the evacuation plan for the WIPP facility, as required under 20.4.1.500 NMAC (incorporating 40 CFR §264.52(f)).

F-7a Surface Evacuation On-site and Off-site Staging Areas

Figure F-8 shows the surface staging areas. Personnel report to their Office Wardens at designated staging areas where accountability is conducted. If site evacuation is necessary, the RCRA Emergency Coordinator will decide which staging areas are to be used and will advise Office Wardens of the selections. The RCRA Emergency Coordinator will communicate the locations to Office Wardens via office warden pager, radio, plectron, WIPP Security, or telephone, as appropriate. Office Wardens will direct personnel to the selected staging area outside the security fence. Personnel who are working in a contaminated area when site evacuation is announced, will assemble at specific staging areas to minimize contact with other personnel during the evacuation (Figure F-8).

Office Wardens conduct accountability of personnel assigned to their specific areas. For complete surface accountability, the Office Wardens report to their ACOW, who reports to the COW. When the COW has reports from all ACOWs, surface accountability is reported to the CMRO, who then notifies the RCRA Emergency Coordinator of the accountability.

The COW and all ACOWs have radios for communication between them and the CMRO. The Office Wardens, Assistant Office Wardens, ACOWs, and COW also have pagers with which they are notified of evacuations. At the staging areas Office Wardens report directly to their ACOW.

There are three off-site staging areas identified on Figure F-8. The RCRA Emergency Coordinator determines which staging area will be used. Security officers remain at the primary staging area gate 24 hours a day, and the vehicle trap is opened for personnel during emergency evacuations. The north gate has a single person gate and large gate which can be opened, similar to the main gates for the primary staging area. The east gate is a turnstile gate.

Upon notification by the RCRA Emergency Coordinator, Security will respond, open gates, and facilitate egress for evacuation.

The on-site staging areas are identified in Figure F-8. These are used for building or area evacuations as determined by the RCRA Emergency Coordinator.

F-7b Underground Assembly Areas and Egress Hoist Stations

In the event of an underground or surface event, the RCRA Emergency Coordinator can call for underground personnel to report to assembly areas (Figure F-9). Underground personnel are also trained to immediately report to assembly areas under specific circumstances (i.e. loss of underground power or ventilation). If accountability is required, the underground will be evacuated. The Underground Controller is responsible for underground accountability by comparing the brass numbers with the brass tags signed out in the lamproom. Each assembly area contains a Mine Page Phone, miners aid station, and evacuation maps.

In accordance with 30 CFR §57.11, the mine maintains two escapeways. These escapeways are designated as Egress Hoist Stations. When an underground evacuation is called for, all underground personnel report to the Egress Hoist Stations.

Decontamination of underground personnel will be conducted the same way as described for surface decontamination. Contaminated personnel are trained to remain segregated from other personnel until RC personnel can respond to the incident at the underground location.

F-7c Plan for Surface Evacuation

Surface evacuation notification is initiated by the RCRA Emergency Coordinator directing the CMRO to sound the surface evacuation alarm. The Office Wardens assist personnel in evacuation from their areas. Evacuation routes and instructions are posted throughout the site.

If the EST/FPT notifies the ERT members by pager to respond to an identified area, these members will not depart the site during an evacuation, but will report to the EST/FPT for instructions and accountability. The EST/FPT notifies the COW of response members present. These personnel will not evacuate until released by the RCRA Emergency Coordinator.

F-7d Plan for Underground Evacuation

Notification for underground evacuation will be made using the underground evacuation alarm and strobe light signals.

Personnel will evacuate to the nearest egress hoist station. Primary underground evacuation routes (identified by green reflectors on the rib) will be used, if possible. Secondary underground evacuation routes (identified by red reflectors on the rib) will be used if necessary (Figure F-5). Brass tags will be collected from personnel at the hoist collar on the surface, and taken to the Underground Controller, who functions as an Office Warden. When all brass tags are accounted for, underground accountability is reported to the RCRA Emergency Coordinator.

Upon reaching the surface, personnel will report to their on-site staging area to receive further instructions.

Members of the FLIRT and the MRT who may be underground, will evacuate the underground when an underground evacuation is called for. A reentry by the MRT will be performed according to 30 CFR 49 and MSHA regulations for reentry into a mine. The two MRTs are trained in compliance with 30 CFR 49 in mine mapping, mine gases, ventilation, exploration, mine fires, rescue, and recovery.

F-7e Further Site Evacuation

In the event of an evacuation involving the need to transport employees, the following transportation will be available:

- Buses/vans—WIPP facility buses/vans will be available for evacuation of personnel. The buses/vans are stationed in the employee parking lot.
- Privately Owned Vehicles—Because many employees drive to work in their own vehicles, these vehicles may be utilized in an emergency. Personnel may be directed as to routes to be taken when leaving the facility.

These vehicles may be used to transport personnel who have been released from the site by the RCRA Emergency Coordinator.

F-8 Required Reports

The RCRA Emergency Coordinator, on behalf of the Permittees, will note in the operating record the time, date, and details of any incident that requires implementing this Contingency Plan. This notation will be in the facility log maintained by the CMRO. In compliance with 20.4.1.500 NMAC (incorporating 40 CFR §264.56(j)), within 15 days after the incident, the Permittees will ensure that a written report on the incident will be submitted to the EPA Region VI Administrator and to the Secretary of the NMED. The report will include:

- The name, address, and telephone number of the Owner/Operator
- The name, address, and telephone number of the facility
- The date, time, and type of incident (e.g., fire, explosion or release)
- The name and quantity of material(s) involved
- The extent of injuries, if any
- An assessment of actual or potential hazards to human health or the environment, where this is applicable
- The estimated quantity and disposition of recovered material that resulted from the incident

In addition to the above report, the Permittees will ensure that the ES&H Manager, or designee, submits reports to the appropriate agencies as listed in Tables F-8 and F-9.

In accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.56(i)), the Permittees will notify the Secretary of the NMED and EPA Region VI Administrator that the WIPP facility is in compliance with requirements for the cleanup of areas affected by the emergency and that emergency equipment used in the emergency response has been cleaned, repaired, or replaced and is fit for its intended use prior to the resumption of waste management operations in affected areas. The means the WIPP facility will use to meet these requirements are described in Sections F-4e, F-4f, F-4g, and F-4h.

The WIPP requires the EST/FPT to initiate the "WIPP Hazardous Materials Incident Report" if the Contingency Plan is implemented. A form is attached as Figure F-12. The form is initiated by the EST/FPT. The RCRA Emergency Coordinator, CMRO, and Environmental Compliance representatives complete their respective sections.

F-9 Location of the Contingency Plan and Plan Revision

The owner/operator of the WIPP facility will ensure that copies of this Contingency Plan are available through the WIPP electronic controlled-document distribution system or in appropriate controlled-document locations throughout the facility and are, consequently, available to all emergency personnel and organizations described in Section F-2. In addition, the owner/operator will make copies available to the following outside agencies:

- Mississippi Potash Inc. and IMC Kalium
- New Mexico Energy, Minerals, and Natural Resources Department
- Carlsbad Fire Department, Carlsbad
- Carlsbad Medical Center, Carlsbad
- Lea Regional Hospital, Hobbs
- Otis Fire Department, Otis
- Hobbs Fire Department, Hobbs
- Joel Fire Department, Carlsbad
- BLM, Carlsbad
- New Mexico State Police

The owner/operator of the WIPP facility will ensure that this plan is reviewed annually and amended whenever:

- Applicable regulations are revised

- The RCRA Part B permit for the WIPP facility is revised in any way that would affect the Contingency Plan
- This plan fails in an emergency
- The WIPP facility design, construction, operation, maintenance, or other circumstances change in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous constituents or change the response necessary in an emergency
- The list of RCRA Emergency Coordinators change
- The list of WIPP facility emergency equipment changes.

References

U.S. Environmental Protection Agency, "A Method for Determining the Compatibility of Hazardous Waste," EPA-600/2-80-076, 1980.

U.S. Department of Transportation, Emergency Response Guidebook, U.S. Government Printing Office, 1993.

Westinghouse Electric Corporation, 1994, "Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling," WP 02-EM1, Westinghouse Electric Corporation, Carlsbad, New Mexico.

U. S. Department of Energy, "WIPP Safety Analysis Report," DOE/WIPP-95-2065, Rev. 2

U. S. Department of Energy, "WP 12-5, WIPP Radiation Safety Manual".

TABLES

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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 U/G; FACs 480, 255.1 & 255.2; Transport Tank; Building 456 Trailer 911F	Fire Immediate (acute) Delayed (chronic)
One Standard Waste Box or two or more 55 gallon drums of CH TRU Waste	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-2
RESOURCE CONSERVATION AND RECOVERY ACT EMERGENCY COORDINATORS

Name	Address*	Office Phone	Home Phone*
R. A. (Richard) Marshall (primary)[1]		234-8276 or 234-8695	
R. C. (Russ) Stroble (primary)[1]		234-8276 or 234-8554	
M. L. (Tex) Winans (primary)[1]		234-8276 or 234-8273	
J.E. (Joseph) Bealler[2]		234-8276 or 234-8916	
M.G. (Mike) Proctor[2]		234-8457	
G. L. (Gary) Kessler[2]		234-8326	
A. E. (Alvy) Williams[1] (primary)		234-8216 or 234-8276	
P.J. (Paul) Paneral[2]		234-8498	
M.L. (Mark) Long[2]		234-8170	

*NOTE: Personal information (home addresses and phone numbers) has been removed from information copies of this application.

[1] The on-duty Facility Shift Manager is the primary RCRA Emergency Coordinator pursuant to 20.4.1.500 NMAC (incorporating 40 CFR §264.52), and is designated to serve as the RCRA Emergency Coordinator.

[2] The on-duty Facility Operations Engineer is the alternate RCRA Emergency Coordinator and is available as needed.

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 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-4
PHYSICAL METHODS OF MITIGATION

METHOD	CHEMICAL		RADIOLOGICAL	
	LIQUID	SOLID	LIQUID	SOLID
ABSORPTION	YES	NO	YES	NO
COVERING	YES	YES	YES	YES
DIKES, DIVERSIONS	YES	YES	YES	YES
OVERPACK	YES	YES	YES	YES
PLUG/PATCH	YES	YES	YES	YES
TRANSFER	YES	YES	YES	YES
VAPOR SUPPRESSION	YES	YES	NO	NO

TABLE F-5
CHEMICAL METHODS OF MITIGATION

METHOD	CHEMICAL		RADIOLOGICAL	
	LIQUID	SOLID	LIQUID	SOLID
NEUTRALIZATION	YES	YES[1]	NO	NO
SOLIDIFICATION	YES	NO	YES[2]	NO

(1) When solid neutralizing agents are used, they will be used simultaneously with water.
(2) This method could be utilized for mitigation of firewater involving TRU-waste.

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

Equipment	Description and Capabilities	Location
Communications		
Building Fire Alarms	Manual pull stations and automatic devices (sprinkler system flow, and smoke and thermal detectors) trigger fire alarm; locally visible and audible; visual display and alarm in Central Monitoring Room (CMR)	Guard and Security Building, Pumphouse, Warehouse/Shops, Exhaust Filter Building, Support Building, CMR/ Computer Room, Waste Handling Building, TRUPACT Maintenance Facility, SH Hoisthouse, Maintenance Shops, Guard Shack*, Auxiliary Warehouse, Core Storage Building, Engineering Building, Training Facility, Safety Building, Maintenance Shop, Hazardous Waste Storage (non-TRU) Area (Facility 474) *local alarms; not connected to the CMR
Underground Fire Alarms	Automatic/Manual; have priority over other paging channel signals but not override intercom channels; alarms sound in the general area of the control panel and are connected to the underground evacuation alarms; they also interface with the CMR.	Fire detection and control panel locations: Waste Shaft Underground Station, SH Shaft Underground Station, Between E-140 and E-300 in S-2180 Drift, E-O/N-1200, Fuel Station
Site-wide Evacuation Alarm	Transmitted over paging channel of the public address system, overriding its normal use; manually initiated according to procedures requiring evacuation; audible alarm produced by tone generator at 10 decibels above ambient noise level (or at least 75 decibels); flashing strobe lights; radios and/or pagers are used to notify facility personnel outside alarm range. Monthly test are performed on the PA, site notification alarms, and plectrons.	Site-wide
Vehicle Siren	Manual; oscillating; emergency services/surface response vehicles, is mechanical and electronic.	WIPP surface emergency vehicles
Public Address System	Includes intercom phones; handset stations and loudspeaker assemblies, each with own amplifiers; multichannel, one for public address and pages, and others for independent party lines.	Surface and underground
Intraplant Phones	Private automatic branch exchange; direct dial; provide communication link between surface and underground operations	Throughout surface and underground
Mine Page Phones	Battery-operated paging system	CMR, Mine Rescue Room, EOC, lamproom, underground at S550/W30, S100/W30, S1950/E140, SH Shaft Collar and Underground Station, Waste Shaft Collar and Underground Station, FSM desk.

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

	Equipment	Description and Capabilities	Location
1	Emergency Pagers	Manual; , intermittent alarm signals	Issued to appropriate emergency personnel
2	Plectrons	Tone-alert radio receivers placed in areas not accessible by the public address system	Site-wide
3	Portable Radios	Two-way, portable; transmits and monitors information to/from other transmitters	Issued to individuals
4	Plant Base Radios	Two-way, stationary, VHF-FM; linked to Eddy County Sheriff Department, NM State Police, and Otis Fire Department), and WIPP Channels 1-18 (Communication with the Lea County Sheriff's Department, the Hobbs Fire Department, Carlsbad Medical Center and Lea Regional Hospital is available via the Eddy County dispatcher) (Site Security, Site Operations and Site Emergency, maintenance, repeater to Carlsbad). Wireless communications such as cellular phones may be used to contact the Eddy County emergency responders.	Various site locations
5	Mobile Phones	Provide communications link between WIPP Security and key personnel	Issued to individuals plus emergency vehicles,
6	Spill Response		
7 8	SPILL-X-S Guns and Recharge Powder	Containment; (1)SPILL-X model SC-30-C(Gun) (1)SPILL-X model XC-30-S(Gun) (1)SPILL-X model SC-30-A(Gun); (1) A-Acid, 5 gallon bucket (Recharge Powder) (1)S-Solvent, 5 gallon bucket (Recharge Powder) (1)C-Caustic, 5 gallon bucket (Recharge Powder)	HAZMAT trailer
9	Absorbent Sheets	Containment or cleanup; (1) 3' x 100' Sheet	HAZMAT trailer
10	Absorbents	Grab and Go container; spill control bucket; (1) for solvents and neutralizing absorbents; 5 gallon bucket (1) for acids/caustics; 5 gallon bucket	HAZMAT trailer
11	Absorbent Material	Containment or cleanup; (1) 100 ft. rolled or equivalent socks " Pig" for general liquid (1) 100 ft. rolled or equivalent socks " Pig" for oil	HAZMAT trailer
12	Air Bag System	Extrication, Stabilization, Cribbing (1) bag system with tank kit and the following bag sizes: (1)12-ton, (1) 21.8-ton, (1)17-ton	Surface rescue truck
13	Air Chisel	Extrication (1) Capable of cutting 3/16" steel	Surface rescue truck

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

Equipment	Description and Capabilities	Location
Drum Transfer Pumps and Drum Opener	Containment or cleanup; (1) unit for chemical transfer (1) hand operated pump for petroleum transfer (1) drum opener	HAZMAT trailer
Floor Squeegee	Containment or cleanup; (1) straight rubber blade, nonwood handle	HAZMAT trailer
Foam Concentrate	AFFF 6% (4) 5-gallon pail	Fire truck # 1
Gas Cylinder Leak Control Kit	(1)Series A Hazardous Material Response Kit; contains nonsparking equipment to control and plug leaks	HAZMAT trailer
Portable Generator	(1)Backup power; 5,000 watt; 120 or 240 volt	Surface rescue truck
Hand Tools	Containment and cleanup; Underground rescue truck: (1)12# Sledge Hammer (1)3/8" Drive Socket Set (1)½" Drive Socket Set (1)3/4" Drive Socket Set (1)25' ½" Chain (1)6' Wrecking Bar (1)Bottle Jack (1)4# Hammer (1)18" Crescent Wrench (1)5' Pry Bar (1)2' Pry Bar (1)100' Extension Cord (1)4' Nylon Sling (1)6' Nylon Sling (1)10' Nylon Sling These tools are located in the HAZMAT Trailer. They are non-sparking. (1)14"L adjustable pipe wrench (1)15" multi-opening bung wrench (1)hammer/crate opener (1)8" pipe pliers (1)8" blade Phillips (1)#2 screwdriver (1)6" blade standard screwdriver (1)Claw Hammer	Underground rescue truck, HAZMAT trailer
Come-a-longs	(1) 4-ton; cable-type Ratchet lever tool designed specifically for lifting, lowering and pulling applications including jobs requiring rigging, positioning, and stretching. Used in rescue for extrication.	Surface rescue truck and underground rescue truck
Porta-power	(1) 10-ton hydraulic, hand-powered jaws used for extrication during rescues.	Surface rescue truck
Jugs	Containment or cleanup; (4) 1-gallon plastic	HAZMAT trailer

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

	Equipment	Description and Capabilities	Location
1	Pails	Containment or cleanup; (3) 5-gallon plastic with lid	HAZMAT trailer
2	Portable Lighting	(1) Emergency lighting system; 120 volts; 500-watt bulbs, suitable for wet location	Underground rescue truck
3	Patching Kit	Series A Hazardous Response Kit; Class A; contains nonsparking equipment to control and plug leaks.	HAZMAT trailer
4	Scoops and Shovels	Cleanup; plastic; various sizes; nonsparking; nonwood handles (1) Scoop (3) Shovels	HAZMAT trailer
5	Medical Resources		
6	Ambulance #1	Equipped as per Federal Specifications KKK-A-1822 and New Mexico Emergency Medical Services Act General Order 35; equipped with a radio to Carlsbad Medical Center, VHF radio, UHF medical frequency, cellular phone	Surface (Safety and Emergency Services Facility)
7	Ambulance #2	Diesel hardcab ambulance equipped with first aid kit, 2 stretchers, and other associated medical supplies	Underground
8	Rescue Truck	Special purpose vehicle; light and heavy duty rescue equipment; transports 1 litter patient, medical oxygen and supplies for mass casualties, fire suppression support equipment (rescue tool, air bag, K-12 Rescue Saw, 5,000-watt generator, self-contained breathing apparatus (SCBA), and much more equipment	Surface (Safety and Emergency Services Facility)

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

Equipment	Description and Capabilities	Location
Fire Detection and Fire Suppression Equipment		
Building Smoke, Thermal Detectors, or Manual Pull Stations	Ionization and photoelectric or fixed temperature/rate of rise detectors; visual display and alarm in CMR; manual pull stations. The underground has manual fire alarm pull stations located where personnel have access when evacuating. These are connected to the U/G evacuation alarm.	Guard and Security Building, Warehouse/Shops, Support Building, CMR/Computer Room, Waste Handling Building, TRUPACT Maintenance Facility, Waste Shaft Collar, Underground Fuel Station, SH Hoisthouse, Engineering Building, Industrial Safety Building, Training Facility
Fire Truck # 1	Equipped per Class "A" fire truck per NFPA; capacity 750 gallons, with pump capacity of 1200 gallons per minute	Surface (Safety and Emergency Services Facility)
Rescue Truck # 2 (U/G)	(1) 125-pound dry chemical extinguisher (1) 150-pound foam extinguisher	Underground
Extinguishers	Individual fire extinguisher stations; various types located throughout the facility, conforming to NFPA-10.	Buildings, underground, and underground vehicles
Automatic Dry Chemical Extinguishing Systems	Automatic; 1,000-pound system (Purple K); actuated by thermal detectors or by manual pull stations	Underground fuel station
Sprinkler Systems	Fire alarms activated by water flow	Pumphouse, Guard and Security Building, Support Building, Waste Handling Building (contact-transuranic waste area only), Warehouse/Shops Building, Auxiliary Warehouse Building, TRUPACT Maintenance Facility, Training Facility, SH Shaft Hoisthouse, Exhaust Filter Building, Engineering Building, and Safety Building
Water Tanks, Hydrants	Fire suppression water supply; one 180,000-gallon capacity tank, plus a second tank with 100,000 gallon reserve	Tanks are at southwestern edge of WIPP facility; pipelines and hydrants are throughout the surface
Fire Water Pumps	Fire suppression water supply; 125 pounds per square inch, 1,500 gallons per minute centrifugal pump, one with electric motor drive, the other with diesel engine; pressure maintenance pump	Pumphouse

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

Equipment	Description and Capabilities	Location
Fire Hose Connections	Fire suppression water supply	Pumphouse, Guard and Security Building, Support Building, Waste Handling Building (contact-transuranic waste area only), Warehouse/Shops Building, Auxiliary Warehouse Building, TRUPACT Maintenance Facility, Engineering Building, Exhaust Filter Building
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 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

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

	Equipment	Description and Capabilities	Location
1	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
2	Resuscitators (Bag)	Disposable bag resuscitation Ambulance #1: (2) adult size (1) child size Underground Ambulance: (2) adult size	Ambulance # 1, Ambulance # 2
3	Splints	Immobilize limbs; (1) Adult traction splint, lower extremity, with limb-supporting slings, padded ankle hitch and traction device per ambulance. (2) Rigid splinting devices or equivalents, suitable for immobilization of upper extremities per ambulance. (2) Rigid splinting devices or equivalents, suitable for the immobilization of lower extremities. (1) Set of Airsplints: 6 assorted splints; hand/wrist, half arm, full arm, foot/ankle, half leg, and full leg per miner's aid stations.	Ambulance # 1 and # 2, Miner's Aid Stations
4	Stretchers	Patient transport; (2) Spine Boards, one short and one long, with nylon straps per ambulance. (also used to perform cardiopulmonary resuscitation) (2) Emergency Stretchers or scoops, or combination per ambulance (1) All-purpose multi-level ambulance stretch (gurney), with 3 safety straps and locking mechanism per ambulance. (1) Stretcher in each miner's aid station.	Various combinations in Ambulance # 1 and # 2, Miner's Aid Station
5	Suctions	For medical emergencies: Portable (1) Suction unit, capable of delivering at least 300 mm. HG on each ambulance.	Ambulances #1 and #2

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

	Equipment	Description and Capabilities	Location
1	Trauma Kits	(1) adult blood pressure cuff and stethoscope (4) soft-roller bandages (3) triangular bandages (1) pkg. band-aids (2) trauma dressings (25) 4X4 sponges (1) roll adhesive tape (1) bite stick (1) penlight (1) sterile burn sheet (1) oropharyngeal airway (1) glucose substance (2) sterile gauze dressings	(1) kit in each: Ambulances #1 and #2, surface rescue truck
2	Miner's Aid Station	For First Aid Stations in the Underground (1) Stretcher--as referenced above per station (1) Set of airsplints--as referenced above per station (1) Blanket per station (1) Box of latex gloves (50) per station (5) Pathogen Wipes per station (1) First Aid Kit (24) per station; includes, (3) Band-Aid Combo Paks (2) Swabs, PVP (1) Antibiotic Ointment (1) Sting-Kill Swab (2) Dressing, compresses (2) Roller Bandages (2) Tape (2) Triangle Bandage (1) Eyedressing Pak (1) Burn Dressing (1) Ammonia Inhalants (1) User Log Sheet	Miner's Aid Stations - Various Underground Locations
3	First Aid Supplies	According to General Order #35 (12) bandages, soft roller, self-adhering type--4" or 6" x 5 yards. (6) triangular bandages, 40" (1) box band-aids (1) 1 pair bandage shears (6) Trauma dressings, 30" x 10" (6) Trauma dressings, 5" x 7" (50) 4" x 4" sponges, individually wrapped and sterile (2) rolls adhesive tape (1) penlight (2) sterile burn sheets (2) oropharyngeal airways -- adult (2) oropharyngeal airways -- child (Ambulance #1 only) (2) oropharyngeal airways -- infant (Ambulance #1 only) (1) Glucose substance (3) Occlusive dressings (1) Roll aluminum foil (6) Rigid cervical collars--2 each small, medium and large sizes (4) Cold packs (4) Heat packs (2) Bite sticks	Ambulance #1

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

Equipment	Description and Capabilities	Location
First Aid Supplies	(2) Transfer sheets (2) Blankets	Ambulances #1 and #2
First Aid Supplies	(2) #16g angiosets (2) #18g angiosets (2) #20g angiosets (1) 1000cc LR IV fluid (1) 500cc NS IV fluid	Ambulances #1 and #2, surface rescue truck
General Plant Emergency Equipment		
Emergency Lighting	For employee rescue and evacuation, and fire/spill containment; linked to main power supply, and selectively linked to back up diesel power supply and/or battery-backed power supply	Surface and underground
Backup Power Sources	Two diesel generators, and battery-powered uninterruptible power supply (UPS); use limited to essential loads; manual or remote starting 1,100-kilowatt diesel generators with on-site fuel for 62% load for 3 days for selected loads; 30-minute battery capacity for essential loads	Generators are east of Safety and Emergency Services Building; UPS is located at the essential loads
Hoists	Hoists in Waste Shaft, Air Intake Shaft, and SH Shaft	Waste Shaft, Air Intake Shaft, SH Shaft
Radiation Monitoring Equipment	(5) Portable alpha and beta survey meters, portable air samplers, and portable continuous air monitors	Building 412
Emergency Shower	For emergency flushing of contaminated individual	Surface
Eye Wash Fountains	For emergency flushing of affected eyes	Various locations on surface and in the underground
Decon Shower Equipment	Self-contained decon shower trailer, portable decon shower unit, disposable decon shower	Surface
Overpack containers	14-85 Gallon drums 4-SWBs 1-TDOP	Building 481 Building 481 Building 481
HEPA Vacuums	2 HEPA Vacuums to be utilized for removal of contamination.	Building 481
Aquaset or Cement	100 lbs. of aquaset or cement material for solidification of liquid waste generated as a result of fire fighting water or decontamination solutions.	Building 481
Polyvinyl Alcohol or Paint	1 - 5 gallon bucket of approved fixative to be used during recovery.	Building 481
TDOP Upender	Upender facilitates overpacking standard waste boxes	Building 481

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

Equipment	Description and Capabilities	Location
Non hazardous Decontaminating Agents	4-1 Gallon bottles for decontamination of surfaces, equipment, and personnel	Building 481

TABLE F-7
TYPES OF FIRE SUPPRESSION SYSTEMS BY LOCATION

LOCATION	AS	AD	MPS	IFHC	PFE
Waste Handling Building	*		*	*	*
Support Building	*		*	*	*
Exhaust Filter Building	*		*	*	*
Water Pumphouse	*		*	*	*
Underground Support Areas (also has rescue truck) (as illustrated in Figure F-5)		*	*		*
Station A Effluent Monitoring Shed			*		*
Station B Effluent Monitoring Shed			*		*

(1)Symbols for WIPP fire-protection systems:

AS = Automatic Wet Pipe Sprinkler System
AD = Automatic Dry Chemical Extinguishing System
MPS = Manual Pull Stations
IFHC = Interior Fire Hose Connections
PFE = Portable Fire Extinguishers

(2)The Waste Handling Building and the Support Building contain the following:

- Automatic wet pipe sprinklers
- Interior fire hose connections
- Fire detection in the heating, ventilation, and air conditioning instrumentation (Support Building, only)
- Manual pull stations
- Portable fire extinguishers
- Automatic detectors

The Safety and Emergency Services Building contains the following:

- Automatic wet pipe sprinklers
- Manual pull stations
- Portable fire extinguishers
- Automatic detectors

The Core Storage Building contains the following:

- Automatic wet pipe sprinklers
- Portable fire extinguishers

(3)The Exhaust Filter Building, Underground Facilities, Warehouse/Shops Building, Water Pumphouse, and Salt Handling Hoist house also have portable fire extinguishers, manual pull stations, and automatic detectors.

TABLE F-8
HAZARDOUS RELEASE REPORTING, FEDERAL

Statute	Chemical Releases Covered	To Whom Report Will Be Made	What Will Be Reported	
			Immediately (Oral)	Subsequently (Written)
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)/Superfund Amendments and Reauthorization Act (SARA) (40 CFR Part 302)	"Reportable quantities" of CERCLA/SARA "hazardous substances."	National Response Center: (800) 424-8802, State Emergency Response Commission: (505) 476-9620 (New Mexico State Police, Hazardous Materials Emergency Response), and Local Emergency Planning Committee: (505) 887-9511	1) Chemical identification; 2) what hazardous substance; 3) quantity released; 4) time, location and duration of release; 5) media of release; 6) health risks and medical advice; 7) proper precautions (e.g., evacuation); and 8) name and phone number of reporter and facility.	As soon as practicable, update of oral notice and response action taken. Send report to: New Mexico State Emergency Response Commission, Department of Public Safety, Title III Bureau, P.O. Box 1628, Santa Fe, New Mexico, 87504-1628, and Local Emergency Planning Committee, 101 West Greene Street, Suite 225, P.O. Box 1139, Carlsbad, New Mexico 88220. National Response Center will contact the U.S. Environmental Protection Agency (EPA). EPA may request a written report.
Emergency Planning and Community Right-to-Know Act (SARA Title III) (40 CFR Parts 302 and 355)	SARA Title III "extremely hazardous substances."	National Response Center: (800) 424-8802, State Emergency Response Commission: (505) 476-9620 (New Mexico State Police, Hazardous Materials Emergency Response), and Local Emergency Planning Committee: (505) 887-9511.	1) Chemical identification; 2) what extremely hazardous substance; 3) quantity released; 4) time, location and duration of release; 5) media of release; 6) health risks and medical advice; 7) proper precautions (e.g. evacuation); and 8) name and phone number of reporter and facility.	As soon as practicable, update of oral notice and response action taken. Send report to: New Mexico State Emergency Response Commission, Department of Public Safety, Title III Bureau, P.O. Box 1628, Santa Fe, New Mexico, 87504-1628, and Local Emergency Planning Committee, 101 W Greene Street, Suite 225, Carlsbad, New Mexico 88220. National Response Center will contact the U.S. Environmental Protection Agency (EPA) for an address if a written report is requested by EPA.
Resource Conservation and Recovery Act (RCRA), 40 CFR §§264.56(a) and 265.56(a)	Any imminent or actual emergency situation.	State or local agencies with designated response roles, if their help is needed: Carlsbad Police Department: 885-2111; Carlsbad Fire Department: 885-2111; Eddy County Sheriff: 887-7551.	What assistance is required.	Not Applicable (NA)

TABLE F-8
HAZARDOUS RELEASE REPORTING, FEDERAL

Statute	Chemical Releases Covered	To Whom Report Will Be Made	What Will Be Reported	
			Immediately (Oral)	Subsequently (Written)
RCRA, 40 CFR §§264.56(d), 264.56(i), 265.56(d), and 265.56(i)	RCRA "hazardous waste" release, fire, or explosion, which could threaten human health or environment outside the facility.	National Response Center: (800) 424-8802 and State Emergency Response Commission: (505) 476-9620(New Mexico State Police, Hazardous Materials Emergency Response).	(1) Name and telephone number of reporter; (2) name and telephone number of facility; (3) time and type of incident; (4) name and quantity of materials involved; (5) extent of injuries, if any; and (6) possible health or environmental hazards outside the facility.	Prior to resumption of operations, notify that: (1) no waste that may be incompatible with released material is treated, stored, or disposed of until cleanup is complete, and (2) all emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use. Send to Secretary, New Mexico Environment Department, P.O. Box 26110, Santa Fe, New Mexico, 87502.
RCRA, 40 CFR §§264.56(i), 264.56(j), 265.56(i), and 265.56(j)	Any incident which triggers implementation of Contingency Plan.	New Mexico Environment Department, Emergency Response Office, 24-hour telephone: (505) 827-9329 (emergencies); for non-emergencies contact (866) 428-6535 (24 hour voice mail) or Monday to Friday, 8 am to 5 pm: (505) 428-2500.	NA	Within 15 days: 1) name, address and telephone number of owner/operator; 2) name, address and telephone number of facility; 3) date, time and type of incident (e.g. fire, explosion); 4) name and quantity of materials involved; 5) extent of injuries, if any; 6) possible hazards to human health or the environment; 7) estimated quantity of material that resulted from the incident. Prior to resumption of operations, notify that: 1) no waste that may be incompatible with released material is treated, stored, or disposed of until cleanup is complete, and 2) all emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use. Send to Secretary, New Mexico Environment Department, P.O. Box 26110, Santa Fe, New Mexico, 87502.

TABLE F-9
HAZARDOUS RELEASE REPORTING, STATE OF NEW MEXICO

Regulations	Chemical Releases Covered	To Whom Report Will Be Made	What Will Be Reported	
			Immediately (Oral)	Subsequently (Written)
Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1 (20.4.1 NMAC), Subpart V and Subpart VI	RCRA "hazardous waste" releases, fire, or explosion, which could threaten human health or environment outside the facility.	National Response Center: (800) 424-8802; State Emergency Response Commission and (505) 476-9620 (New Mexico State Police, Hazardous Materials Emergency Response)	1) Name and telephone number of reporter; 2) name and telephone number of facility; 3) time and type of incident; 4) name and quantity of material involved; 5) extent of injuries, if any; and 6) possible health or environmental hazards outside the facility.	Prior to resumption of operations, notify that: 1) no waste that may be incompatible with released material is treated, stored, or disposed of until cleanup is complete, and 2) all emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use. Send to Secretary, New Mexico Environment Department, P.O. Box 26110, Santa Fe, New Mexico, 87502.
20.4.1 NMAC, Subpart V and Subpart VI	Any incident which triggers implementation of Contingency Plan.	New Mexico Environment Department, Emergency Response Office, 24-hour telephone: (505) 827-9329 (emergencies); for non-emergencies contact (866) 428-6535 (24 hour voice mail) or Monday to Friday, 8 am to 5 pm: (505)428-2500.	1) Name and telephone number of reporter; 2) name and address of facility; 3) name and quantity of materials involved, to extent known; 4) extent of injuries, if any; and 5) possible hazards to human health or the environment, outside the facility.	Within 15 days: 1) name, address and telephone number of owner/operator; 2) name, address and telephone number of facility; 3) date, time and type of incident (e.g., fire, explosion); 4) name and quantity of materials involved; 5) extent of injuries, if any; 6) possible hazards to human health or the environment; and 7) estimated quantity of material that resulted from the incident. Prior to resumption of operations, notify that: 1) no waste that may be incompatible with released material is treated, stored or disposed of until cleanup is complete, and 2) all emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use. Send to Secretary, New Mexico Environment Department, P.O. Box 26110, Santa Fe, New Mexico, 87502.

TABLE F-9
HAZARDOUS RELEASE REPORTING, STATE OF NEW MEXICO

Regulations	Chemical Releases Covered	To Whom Report Will Be Made	What Will Be Reported	
			Immediately (Oral)	Subsequently (Written)
New Mexico Emergency Management Act, Section 74-4B-5	Any accident (spill) involving hazardous materials (including hazardous substances, radioactive substances, or a combination thereof) which may endanger human health or the environment.	New Mexico Environment Department: (505) 827-9329, State Emergency Response Commission: (505) 476-9620 (New Mexico State Police, Hazardous Materials Emergency Response), and Local Emergency Planning Committee: (505) 887-9511	1) Name, address and telephone number of owner or operator; 2) name, address and telephone number of facility; 3) date, time and type of incident; 4) name and quantity of material(s) involved; 5) extent of any injuries; 6) assessment of actual or potential threat to environment or human health; and 7) estimated quantity and disposition of recovered material.	Written submission within one week of time permittees become aware of discharge. Same as oral and description of noncompliance and its cause, the period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence. Send reports to New Mexico Environment Department, Chief, Ground Water Bureau, P.O. Box 26110, Santa Fe, New Mexico, 87502, New Mexico State Emergency Response Commission Department of Public Safety, Title III Bureau, P.O. Box 1628 Santa Fe, New Mexico, 87504-1628, and Local Emergency Planning Committee, 101 W Greene Street, Suite 225, Carlsbad, New Mexico 88220.
New Mexico Water Quality Control Commission, Part 1, Section 203	Any discharge from any facility of oil or any other water contaminant in such quantities as may, with reasonable probability, injure or be detrimental to human health, animal or plant life, or property.	Chief, Ground Water Bureau, New Mexico Environment Department, or his counterpart in any constituent agency delegated responsibility for enforcement of the rules as to any facility subject to such delegation (505) 827-2918.	Within 24 hours: 1) the name, address, and telephone number of the person or persons in charge of the facility; 2) the name, address, and telephone number of the owner/operator of the facility; 3) the date, time, location, and duration of the discharge; 4) the source and cause of the discharge; 5) a description of the discharge, including its chemical composition; and 6) the estimated volume of discharge, and immediate damage from the discharge.	Submit within seven days: verification of the prior oral notification, also provide any appropriate additions or corrections to the information contained in the prior oral notification. Within 15 days: submit a written report describing any corrective actions taken and/or to be taken relative to the discharge. Send reports to Chief, Ground Water Bureau, New Mexico Environment Department, P.O. Box 26110, Santa Fe, New Mexico, 87502.

TABLE F-9
HAZARDOUS RELEASE REPORTING, STATE OF NEW MEXICO

Regulations	Chemical Releases Covered	To Whom Report Will Be Made	What Will Be Reported	
			Immediately (Oral)	Subsequently (Written)
New Mexico Underground Storage Tank Regulations-2	Any known or suspected release from an Underground Storage Tank (UST) system, any spill or any other emergency situation.	New Mexico Environment Department (Hazardous Waste Bureau): (505) 827-9329.	Within 24 hours: 1) the name, address, and telephone number of the agent in charge of the site at which the UST system is located, as well as the owner/operator of the system; 2) the name and address of the site and the location of the UST system on that site; 3) the date, time, location, and duration of the spill, release, or suspected release; 4) the source and cause of the spill, release, or suspected release; 5) a description of the spill, release, or suspected release, including its chemical composition; 6) the estimated volume of the spill, release, or suspected release; and 7) action taken to mitigate immediate damage from the spill, release, or suspected release.	Mail or deliver within seven days of the incident, a written notice describing the spill, release, or suspected release and any investigation or follow-up action taken or to be taken. Send reports to Underground Storage Tank Program, New Mexico Environment Department, P.O. Box 26110, Santa Fe, New Mexico, 87502.

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FIGURES

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Figure F-1
WIPP Surface Structures

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-4
Direction and Control Under Emergency Conditions in Which the Plan Has Been Implemented

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

Figure F-6
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Underground Diesel Fuel-Station Area Fire-Protection System

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

Figure F-8a
RH Bay Evacuation Routes

Figure F-8b
RH Bay Hot Cell Evacuation Route

Figure F-8c
Evacuation Routes in the Waste Handling Building

Figure F-9
Designated Underground Assembly Areas

Figure F-10
Waste Handling Building Pre-Fire Survey (First Floor)

Figure F-10a
Waste Handling Building Pre-Fire Survey
(First Floor - Fire Hydrant/Post Indicator Location)

Figure F-11
Waste Handling Building Pre-Fire Survey (Second Floor)

Figure F-11a
Waste Handling Building Pre-Fire Survey
(Second Floor - Fire Hydrant/Post Indicator Location)

WIPP HAZARDOUS MATERIAL INCIDENT REPORT

Date:__________ Location:______________________________

I. INITIAL INFORMATION DATE:____________________________ TIME:______________
EST:___________________________________ REPORTED LOCATION:_________________
REPORTED BY:____DEPT.:_________________
INITIALLY REPORTED TO:____________________________________DEPT.:_________________
RESPONSIBLE MANAGER:_____________________________________DEPT.:_________________

II. WEATHER CONDITIONS WIND DIRECTION_________WIND SPEED:________mph TEMP.:_______F
CONDITIONS (i.e.., icy, snowing, raining, cloudy, sunny):______________________________________

III. TYPE OF INCIDENT (SPILL, LEAK, ETC.):_______________________Fire involved: [ ]YES [ ]NO
(If fire is involved attach a copy of the fire report)

MATERIALS INVOLVED	UN/NA NO.	QUANTITY	HAZARD CLASS	NFPA CLASS

IV. PERSONNEL INVOLVED IN CLEAN-UP ACTIVITIES

PERSONNEL/DEPT	DECON METHOD/MEDICAL TREATMENT

V. PERSONNEL CONTAMINATED NOT INVOLVED IN THE CLEANUP ACTIVITIES

PERSONNEL/DEPT.	MATERIAL CONTACTED	DECON/MEDICAL TREATMENT

Figure F-12
WIPP Hazardous Materials Incident Report, Page 1 of 3

WIPP HAZARDOUS MATERIAL INCIDENT REPORT

Date:_______________ Location:___________________________

VI. EQUIPMENT USED FOR CLEAN-UP AND CONTROL MEASURES

EQUIPMENT/MATERIAL/PPE	QUANTITY	DISPOSITION (decon or replacement)

VII. DESCRIPTION OF INCIDENT AND RESPONSE (including containment and control)

____

____

____

____

____

____

____

____

____

____

____

____

____

VIII. ENVIRONMENTAL COMPLIANCE

Date:__________________________ Time:__________________________of evaluation.

Waste Category____

Disposition____

ORGANIZATION	DATE	TIME

EC Representative:____

Print name Signature Date

Figure F-12 (Continued)
WIPP Hazardous Materials Incident Report, Page 2 of 3

WIPP HAZARDOUS MATERIAL INCIDENT REPORT

Date:__________________ Location:______________________

IX. INITIAL NOTIFICATION BY CMRO

DEPARTMENT	PERSON CONTACTED	TIME	NOTIFIED BY
Facility Ops (FSM)			
Emerg. Mgmt (EST)			
EC			
Industrial Safety			
Facility Ops. (FM/FMD)			

CMRO:____
Print name Signature Date
FSM:____
Print name Signature Date

X. CONTINGENCY PLAN IMPLEMENTATION

Contingency Plan implemented [ ]YES [ ]NO

FSM:____
Print name Signature Date

XI. REVIEWS

Report submitted by:____
Print name Signature Date
Emergency Management Manger:____
Print name Signature Date
EC Manager:____
Print name Signature Date
COMMENTS:____
____
____
____
____

Figure F-12 (Continued)
WIPP Hazardous Materials Incident Report, Page 3 of 3

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Figure F-12 (Continued)
WIPP Hazardous Materials Incident Report, Page 3 of 3

DRAWINGS

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ATTACHMENT G

TRAFFIC PATTERNS

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ATTACHMENT G

TRAFFIC PATTERNS

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ATTACHMENT G

TRAFFIC PATTERN

G-1 Traffic Information and Traffic Patterns

Access to the WIPP facility is provided by two access roads that connect with U.S. Highway 62/180, 13 mi (21 km) to the north, and NM Highway 128 (Jal Highway), 4 mi (6.4 km) to the south (Figure G-1). The northern access road, which connects the site to U.S. Highway 62/180, is an access road built specifically for the Permittees that will be used to transport TRU mixed waste from the highway to the site. The southern access road is a county highway maintained by Eddy County. Signs and pavement markings are located in accordance with the Uniform Traffic Control Devices Manual. Access-road design designation parameters, such as traffic volume, are presented in Table G-1.

Rail access is available and may be used for TRU mixed waste transport during the Disposal Phase. Rail access is from the west across the southern access road (marked by railroad crossing signs), but does not cross the northern access road used by the tractor-trailers (Figure G-2). The roadway is raised above the surrounding terrain, ensuring clear visibility of all on-site rail movements. Security opens a locked gate at the West end of the PPA when rail shipments arrive and closes it while the locomotive is on site. The reverse takes place as the locomotive departs. The road crossing will not be blocked for extended periods of time. A railcar mover is used to move railcars into and out of the WHB for waste handling operations when the locomotive is not on site. The alternate truck route to the parking area HWMU at the east end of the WHB will be staffed by the Permittees to protect the crossing during any railcar movements into or out of the WHB.

G-2 Facility Access and Traffic

Access to the facility for personnel, visitors, and trucks carrying supplies and TRU mixed waste is provided through a security checkpoint (vehicle trap). After passing through the security checkpoint, TRU mixed waste transport trucks will normally turn right (south) before reaching the Support Building and then left (east) to park in the parking area HWMU just east of the air locks (Figure G-2). Outgoing trucks depart the same way they arrived, normally out of the west end of the parking area, north through the fence gate and out through the vehicle trap. An alternate inbound route is to continue straight ahead from the security checkpoint to the second road and to turn south to enter the truck parking area. The alternate outbound route is also the reverse of this route. Salt transport trucks, which remove mined salt from the Salt Handling Shaft area, will not cross paths with TRU mixed waste transporters; instead, they will proceed from the Salt Handling Shaft northward to the salt pile. Figure G-2 shows surface traffic flow at the WIPP facility.

The site speed limit for motor vehicles is 10 mph (16 kph) and 5 mph (8 kph) for rail movements. Speed limits are clearly posted at the entrance to the site and enforced by security officers. There are no traffic signals. Stop signs are located at the major intersections of roadways with the main east-west road. Safety requirements are communicated to all site personnel via

General Employee Training within 30 days of their employment. Employee access to on-site facilities requires an annual refresher course to reinforce the safety requirements. Security officers monitor vehicular traffic for compliance with site restrictions, and provide instructions to off-site delivery shipments. Vehicular traffic other than the waste transporters use the same roads, but there will be no interference because there are two lanes available on the primary and alternate routes for waste shipments. Pedestrian traffic is limited to the sidewalks and prominently marked crosswalks. Site traffic is composed mostly of pickup trucks and electric carts with a frequency of perhaps 10 per hour at peak periods. Emergency vehicles are exercised periodically for maintenance and personnel training, with an average frequency of one each per day. They are used for their intended purpose on an as-required basis.

The traffic circulation system is designed in accordance with American Association of State Highway and Transportation Officials (**AASHTO**) Site Planning Guides for lane widths, lateral clearance to fixed objects, minimum pavement edge radii, and other geometric features. Objects in or near the roadway are prominently marked.

On-site roads, sidewalks, and paved areas are used for the distribution and storage of vehicles and personnel and are designed to handle all traffic generated by employees, visitors, TRU mixed waste shipments, and movements of operational and maintenance vehicles. The facility entrance and TRU mixed waste haul roads are designed for AASHTO H20-S16 wheel loading. Service roads are designed for AASHTO H10 wheel loading. Access and on-site paved roads are designed to bear the anticipated maximum load of ~~80,000~~115,000 lbs (~~36,287.2~~ 52,163.1 kg), the maximum allowable weight of a truck/trailer carrying loaded Contact-Handled or Remote-Handled Packages. The facility is designed to handle ~~an average of five~~ approximately eight truck trailers per day, each carrying ~~three~~ one or more Contact-Handled or Remote-Handled Packages. ~~Outbound transporters with empty shipping containers will match that number daily.~~ This is equivalent to ~~2,600~~ 3,640 TRU mixed waste-carrying vehicles per year.

The calculations to support the anticipated maximum load of 115,000 lbs. are shown below:

Soil Resistance R (psi) - is taken directly from the WIPP Soil Report and Bechtel calculation because there is no change.

A. <u>Pavement Thickness</u>
The traffic frequency increase from 10 shipments per day to 10.15 shipments per day has only minimal impact on the Total Expanded Average Load (EAL) and the traffic index (TI) as shown below, both important parameters in pavement design.

Total EAL (TEAL):
13,780 ~ constant for 5 or more axles over 20 years, taken from Table 7-651.2A - Highway Design Manual (HDM).
TEAL = 13,780 x 25yr./20yr. = 17,225
Using 10.15 shipments per day ~ 17,225 x 10.15 = 174,834

Conversion of EAL to Traffic Index (TI).
For TEAL of 174,834 ~ TI = 7.5 - (from HDM, Table 7-651.2B)

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 = 2.01Y TAC = 0.48/2.01= 0.24' Y use 2½" AC Surface Course.
(Actually used: 3")
Gf - Gravel Equivalent Factor (constant from Table 7-651.2C from HDM).

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

C. <u>Caliche Subbase ~ TCSB</u>
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) Y 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 <u>Waste Handling Building Traffic</u>

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 deck, where the loaded facility pallet will be transferred to the waste hoist~~, and the facility transfer vehicle will be backed out~~ and downloaded for emplacement.

RH TRU mixed waste will arrive at the WIPP facility in a payload container contained in a shielded cask loaded on a tractor-trailer. Upon arrival, radiological surveys, security checks, and shipping documentation reviews will be performed, and the trailer carrying the cask will be moved into the Parking Area or directly into the RH Bay of the Waste Handling Building Unit.

The cask is unloaded from the trailer in the RH Bay and is placed on the Cask Transfer Car. The Cask Transfer Car is used to move the cask to the Cask Unloading Room. At this point, a crane moves the waste to the Hot Cell or the Transfer Cell. Some RH TRU mixed waste may be moved to the Hot Cell for overpacking before being moved to the Transfer Cell. Once in the Transfer Cell, the Transfer Cell Shuttle Car moves the waste beneath the facility cask. A crane is used to move the waste from the Transfer Cell Shuttle Car into the facility cask. The Facility Cask Transfer Car then moves the facility cask to the underground. A more detailed description of waste handling in the WHB is included in Attachment M1. Figures G-5, G-6 and G-7 show RH TRU mixed waste transport routes.

G-4 Underground Traffic

Underground traffic, with and without TRU mixed waste, will travel on separated paths. The ventilation and traffic flow path in the TRU mixed waste handling areas underground are restricted and separate from those used for mining and haulage (construction) equipment (Figure G-4). Non-waste and non-construction traffic use the same routes as waste and construction traffic. In general, waste traffic will use the intake ventilation drift in that area. The exhaust drift in the construction area will generally be used for mining/construction equipment for maximum isolation of this activity from personnel. The exhaust drift in the waste disposal area will normally not be used for personnel access. Non-waste and non-construction traffic is generally comprised of escorted visitors only and is minimized during each of the respective operations.

Adequate clearances that exceed the mining regulations of 30 CFR §57 exist underground for safe passage of vehicles and pedestrians. Pedestrians/personnel are required to yield to vehicles in the WIPP underground facility. This condition is reinforced through the WIPP equipment operating procedures, the WIPP Safety Manual, the WIPP safety briefing required for all underground visitors, the General Employee Training annual refresher course, and the Underground annual refresher course that are mandated by 30 CFR §57, the New Mexico Mine Code, and DOE Order 5480.20A.

In addition, other physical means are utilized to safeguard pedestrians/personnel when underground such as:

All equipment operators are required to sound the vehicle horn when approaching intersections.

All airlock and bulkhead vehicle doors are equipped with warning bells or strobe lights to alert personnel when door opening is imminent.

Hemispherical mirrors are used at blind intersections so that persons can see around corners.

All heavy equipment is required to have operational back-up alarms.

Heavily used intersections are well lighted.

Typically, the traffic routes during waste disposal in all Panels will use the same main access drifts.

All traffic safety is regulated and enforced by the Federal and State mine codes of regulations (30 CFR §57 and New Mexico State Mine Code). The agencies that administer these codes make regular inspection tours of the WIPP underground facilities for the purpose of enforcement.

All underground equipment is designed for off-road use since all driving surfaces are excavated in salt. No loads on the underground roadways will exceed the bearing strength of in situ halite.

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TABLES

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TABLE G-1
WASTE ISOLATION PILOT PLANT SITE DESIGN DESIGNATION TRAFFIC PARAMETERS[a]

Traffic Parameter	North Access Road (No. of Vehicles, unless otherwise stated)	South Access Road (No. of Vehicles, unless otherwise stated)	On-Site Waste Haul Roads Contact-Handled and Remote-Handled Package Traffic)
Average Daily Traffic (ADT)[b]	800	400	~~6~~ 8
Design Hourly Volume (DHV)[c]	144	72	NA[g]
Hourly Volume (Max. at Shift Change)	250	125	NA
Distribution (D)[d]	67%	~~67~~ 33%	NA
Trucks (T)[e]	2%	0	100%
Design Speed[h,i]	70 mph (113 kph)	60 mph (97 kph)	25 mph (40 kph)
Control of Access[f]	None	None	Full

[a] For WIPP personnel and TRU mixed waste shipments only.
[b] ADT—Estimated number of vehicles traveling in both directions per day.
[c] DHV—A two-way traffic count with directional distribution.
[d] D—The percentage of DHV in the predominant direction of travel.
[e] T—The percentage of ADT comprised of trucks (excluding light delivery trucks).
[f] Control of Access—The extent of roadside interference or restriction of movement.
[g] NA—Not applicable.
[h] mph—miles per hour.
[i] kph—kilometers per hour.

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FIGURES

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Figure G-1
General Location of the WIPP Facility

Figure G-2
WIPP Traffic Flow Diagram

Figure G-3
Waste Transport Routes in Waste Handling Building - Container Storage Unit

Figure G-4
Underground Transport Route

Figure G-5
RH Bay Waste Transport Routes

Figure G-6
RH Bay Cask Loading Room Waste Transport Route

Figure G-7
RH Bay Canister Transfer Cell Waste Transport Route

ATTACHMENT H

PERSONNEL TRAINING

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ATTACHMENT H

PERSONNEL TRAINING

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PERSONNEL TRAINING

Introduction

This chapter describes the personnel training program for the Waste Isolation Pilot Plant (**WIPP**) in accordance with the requirements of the Resource Conservation and Recovery Act (**RCRA**) and the New Mexico Hazardous Waste Act as described in Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1 (20.4.1.500 NMAC), (incorporating 40 CFR §264.16), and 20.4.1.900 NMAC (incorporating 40 CFR §270.14).

The primary objective of the WIPP facility training program is to prepare personnel to operate the WIPP facility in a safe and environmentally sound manner. To achieve this objective, the program provides employees with training relevant to their positions. Every WIPP facility employee, including those not directly involved in transuranic (**TRU**) mixed waste handling activities, receives an introduction to the RCRA and emergency preparedness within 30 days of employment. In this way everyone at the WIPP facility is given, at a minimum, a basic understanding of the regulatory requirements and emergency procedures. Employees in hazardous waste management positions receive additional classroom and on-the-job training designed specifically to teach them how to perform their duties safely and in conformance with regulatory requirements. Hazardous waste management personnel receive the required training before being allowed to work unsupervised, and emergency response personnel receive appropriate training before being called upon to respond to actual emergencies.

The training requirements apply to all appropriate employees of the U.S. Department of Energy (**DOE**) and contractors who regularly work at the facility that may come in contact with and/or manage hazardous waste. The WIPP Project training program is comprehensive and applies to all areas of personnel performance and development. This chapter describes the introductory and continuing training provided to personnel at the WIPP facility, with emphasis on those facility personnel and their supervisors whose jobs are such that their actions or failure to act could result in a spill or release, or the immediate threat of a spill or release of hazardous waste. These personnel are directly involved with hazardous waste management at the WIPP facility. Their training allows them to operate the facility safely and in compliance with hazardous waste regulations.

H-1 Outline of the Training Program

Employee training for the purpose of hazardous waste management at the WIPP facility is the overall responsibility of the MOC General Manager, with responsibility for implementation delegated to the manager of the Human Resources Department. The Human Resources Department Manager has established a technical training group (referred to as Technical Training) within the department to implement the requirements for training. The Technical Training Group is managed by the Technical Training Manager who has the responsibility for directing the training program. Members of the training staff are assigned to Technical Training within the Human Resources Department. The organizational structure of the Human

Resources Department and its relationship to the line organizations is shown in an abbreviated organizational chart in Figure H-1. This chart also shows departments with key responsibilities for waste management and emergency response.

The WIPP facility uses a modified version of the Systematic Approach to Training (**SAT**) to analyze, design, develop, implement, and evaluate training.

This approach employs five distinct phases to develop programs. These phases are:

- Analysis
- Design
- Development
- Implementation
- Evaluation

In "analysis," technical training and line management identify job performance requirements. These requirements are derived by studying job duty areas, related tasks, and required skills and knowledge. These derived skills and knowledge, in turn, form the blueprint for the "design" phase. In "design" these requirements are translated into learning objectives, performance standards, and test items. In "development" the products of design are incorporated into new training programs or, if appropriate, incorporated into revisions of existing programs. Products of development are lesson plans, qualification cards, student materials, and examinations. Implementation of these programs then occurs. This may be through classroom instruction, on-the-job-training, self-paced study, or any combination of the three. "Evaluation" is the final phase of the SAT process. Evaluation uses feedback derived from several sources to improve or enhance the training. The WIPP utilizes extensive guidance provided within the DOE Handbook, "Training Program Handbook: A Systematic Approach to Training (DOE-HDBK-1078-94)," to direct all program analysis, design, development, implementation, or evaluation. Further details of these processes may be derived by reviewing this manual.

The Human Resources Department ensures that required RCRA-related training is conducted by qualified instructors. On-the-job training is conducted by Level I instructors. Level I instructors are subject matter experts; members of line organizations who have qualified on the related equipment and have attended the on-the-job training course. Classroom instruction is provided by Level II and Level III instructors. Level II instructors are members of Technical Training and line organizations who are qualified to conduct limited classroom training in their technical area of expertise. Level III instructors are members of Technical Training who are qualified to conduct classroom training, skills evaluation, and needs assessment. Level II and III instructors are required to attend a train-the-trainer course and periodic refresher training.

Cognizant line managers provide significant input on training requirements for the WIPP facility to qualified instructors who develop the following, as required:

- Classroom Instruction

  Objectives
  Lesson Plans
  Student Materials
  Examinations

- On-the-Job Training

  Qualification Cards

Technical training materials are approved by the Technical Training Manager and the cognizant line manager.

Following technical training, trainees must successfully complete written examinations or oral examinations conducted by boards made up of cognizant personnel (referred to as "oral boards") to demonstrate competency. The records of oral examinations are called "oral board sheets". These examinations are based on objectives and/or competency statements. Oral boards are based on knowledge learned in the on-the-job training process. Trainees also provide feedback on the content and quality of instruction, at this time, in the form of course critiques and verbal input.

Technical training documentation is maintained by the Technical Training Group located at the WIPP facility. These technical training records include:

- Course Attendance
- Completed Qualification Cards
- Off-Site Training Documentation
- Oral Board Sheets

A database is maintained which records training qualifications, and course attendance. The database is used to identify course refresher and requalification dates. Training records on current personnel are kept in the Technical Training files. Technical training records on former employees are kept by the Technical Training Group for at least three years from the date of employment termination from the WIPP facility. Training documentation for emergency response training received by personnel called out in the WIPP Contingency Plan (Permit Attachment F) is maintained by the Technical Training Group. The documents which define the process by which these training activities are managed are maintained by the Technical Training Group and are part of the Operating Record.

To ensure the safe and efficient operation of the WIPP facility, certain positions require formal qualification. Department managers identify these positions based upon safety, complexity, and involvement with hazardous waste handling operations. A document known as a "qualification card" is prepared to identify required training for each designated position. In the case of equipment and system/procedure qualification, a "qualification card" is prepared that specifies the required knowledge and practical skills needed in such areas as equipment maintenance and safety. Individual participation in the qualification card system is varied and is dependent on an incumbent's specific job duties. A complete listing of active qualifications, as they apply to any individual position, may be determined by review of the WIPP Training Database. The list of active WIPP Qualification cards is maintained at the WIPP facility.

When the qualification card is completed, that particular qualification is recorded. Successful completion of formal classroom training is documented on the individual's qualification card. When requirements are met, both for classroom instruction and on-the-job training, and oral board, if applicable, the qualification card is signed by the manager certifying that the employee is fully competent to perform all aspects of the associated qualification. Qualification cards are included in the training records maintained by the Technical Training Group. Qualification cards are living documents subject to change as the scope and content of training changes to meet new and revised regulatory requirements and modifications in job scope.

The hazardous waste management training program described in Section H-1b consists of a series of courses designed to ensure that hazardous waste management employees at the WIPP facility receive initial and continuing training relevant to their positions. These courses include instruction on the RCRA and Occupational Safety and Health Administration regulations, emergency procedures, and procedures for handling both site-generated hazardous waste and TRU mixed waste. Visitors, temporary personnel, and contractors are trained commensurate with the nature of their visit or duties. For visitors, this includes basic site safety and emergency notification procedures. Visitors who require unescorted access are also required to take an examination covering the material in the training they are given. Visitor records are maintained by security. Temporary or subcontract personnel, if hired to fill a hazardous waste management position, are required to complete the same training as permanent personnel. Record of this training is maintained by Technical Training.

H-1a Job Title/Job Description

Employees at the WIPP facility who are involved in hazardous waste management activities receive the same core training. A list of hazardous waste management job titles and position descriptions are provided in Permit Attachment H1. An up-to-date list of personnel assigned to these positions is maintained by Environmental Compliance & Support in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.16). These core hazardous waste management training courses are described briefly in Section H-1(b)(1) and outlines of the core classes, as well as other job specific training classes, are included in Permit Attachment H2. Any changes to the training plan that decrease the type or amount of training that is given to employees will be handled as a Class 2 modification, as specified in 20.4.1.900 NMAC (incorporating 40 CFR §270.42). Other changes to the training plan will be handled as Class 1 modifications. In accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.16(d)(2)), the job descriptions include hazardous and TRU mixed waste management job duties, required skills, qualifications, and experience, as well as educational requirements. These job descriptions are approved by the cognizant staff managers. Included in the appendices are management and supervisory positions that are considered to be critical from the standpoint of hazardous waste management or emergency response. These include the following positions:

- Shift Manager, Facility Operations
- Manager, Hoisting Operations
- Manager, Radiation Control
- Manager, Waste Handling

- Team Leader, Inspection Services
- Manager, Environmental Compliance
- Manager, Technical Training

H-1b Training Content, Frequency, and Techniques

The WIPP training program includes a comprehensive combination of classroom training courses and on-the-job training. Each training course is carefully developed and periodically reevaluated to ensure relevancy to the course objectives and to ensure its support of the goal of safe and environmentally sound operations at the WIPP facility. On-the-job training is accomplished and documented through the use of qualification cards. Before an employee is considered qualified to operate certain equipment, the person must pass a prescribed set of performance standards.

H-1b(1) Training Content

WIPP facility employees who will be on site longer than 30 days, including personnel in management and supervisory positions and personnel not directly involved with hazardous waste management, receive facility-specific training in the following areas:

- General Employee Training (GET) Overview (procedures and policies)
- WIPP Facility Description
- Radiation Safety
- Emergency Preparedness (including RCRA Contingency Plan implementation)
- Security
- Fire Protection
- Quality Assurance
- Occurrence Reporting
- Industrial Safety
- RCRA
- Hazard Communication

This training is provided in GET-19X/GET-20X[1], conducted by the WIPP qualified instructors, and must be completed within 30 days of employment.

Annual refresher training on the topics taught in GET-19X/GET-20X is given in the General Employee Training Annual Refresher (GET-19XA/GET-20XA). This self-paced module provides employees with a review and update of the topics covered in GET-19X/GET-20X.

WIPP employees involved in managing site-generated, nonradioactive waste, or TRU mixed waste will receive the Hazardous Waste Worker course (HWW-101). This comprehensive course will provide job specific training required to safely receive, transfer, or handle waste at the WIPP facility. Review and update of HWW-101 topics is provided annually in the Hazardous Waste Worker refresher course (HWW-102).

[1] The "X" in the course number is assigned the last number of the current year (e.g., GET-19<u>5</u> is General Employee Training for 1995, GET-20<u>0</u> is for the year 2000). Course content is updated annually to provide the latest information available to students.

Course outlines for GET-19X/GET-20X, GET-19XA/GET-20XA, HWW-101, and HWW-102 are provided in Permit Attachment H2.

H-1b(2) Training Frequency

Hazardous waste management courses are offered at a frequency that ensures new hires or transfers can receive relevant training within six months of assuming their new position. Employees do not work unsupervised in hazardous waste management positions until they have completed the required initial training. The Human Resources Department notifies the cognizant manager and training staff when any employee is transferred into or out of a position associated with hazardous waste management.

H-1b(3) Training Techniques

A variety of instructional techniques are used at the WIPP facility depending on the subject matter and the techniques that best suit the learning objectives. Many courses include a combination of lectures, demonstrations, visual aids (such as video tapes, slides, and viewgraphs), and exercises. Most equipment operation courses include hands-on practical instruction.

Written examinations are used as a technique to test and document the knowledge level of individuals participating in classroom training courses. The length and content of each exam varies according to its objective. Calculation, multiple-choice, and fill-in-the-blank, or other approved formats, may be used. If individuals fail a written examination, they must be reexamined in identified areas of weakness. Personnel filling positions requiring qualification cards to perform job functions will be requalified at least biennially in those specific areas.

On-the-job training at the WIPP facility follows a prescribed set of standards specific to the job to be performed. Typically, to become qualified to operate a piece of equipment or system, employees must be able to demonstrate the location and purpose of specified controls and gauges, describe proper startup and shutdown procedures, describe specific safety features and limitations of the equipment, and, in some cases, perform maintenance functions. They must also demonstrate the ability to operate the equipment or system. On-the-job training may also be function specific, such as performing a specific administrative function that is regulated.

In addition to on-the-job training, some positions require the trainee to attend an oral board. The oral board is given upon completion of on-the-job training and prior to operating any equipment unsupervised. In the oral board, the trainee is quizzed on knowledge learned in on-the-job training. The purpose of the oral board is to determine if the trainee fully understands and can apply the knowledge learned in the training process.

H-1c Training Manager

The Technical Training Manager directs the training program and is responsible for establishing technical training requirements in cooperation with the line managers. Specifically, this includes analysis, design, development, implementation, and evaluation of technical training. The Technical Training Manager is trained in hazardous waste management procedures and receives train-the-trainer and instructor training. The Technical Training Manager is also required to be knowledgeable of the applicable regulations, orders, guidelines, and the specific training process employed at the WIPP facility.

The name and qualifications of the current Technical Training Manager are documented at the WIPP facility.

H-1d Relevance of Training to Job Position

The WIPP facility training program provides employees and their supervisors with training relevant to their positions. A functional chart showing positions that receive training related to hazardous waste management or emergency response is included as Figure H-1. This figure also shows the next level manager for these positions. The SAT process mentioned in Section H-1 is a systematic method for determining the proper training for each hazardous waste management position. It compels managers and training staff to look critically at each position and determine the necessary training program for each employee to fully develop their necessary expertise.

Several training courses are determined to be so basic to the WIPP Project mission that they are considered relevant for all WIPP facility employees. The basic philosophy at the WIPP facility is that, as a RCRA-regulated facility, employees must understand the basic regulatory requirements under which the WIPP facility must operate. Therefore, all WIPP facility employees receive an introduction to the RCRA during their introductory training.

Beyond these core courses, training is designed and implemented relevant to the specific job functions being performed. For example, employees who operate key pieces of equipment necessary to manage contact-handled (**CH**) or remote-handled (**RH**) TRU mixed waste (such as forklifts, hoists, bridge cranes, cask transfer cars, etc.) must be trained to operate and inspect equipment and to recognize maintenance problems before a specific job function is performed. These employees must receive on-the-job training and demonstrate the ability to operate the equipment, as appropriate, before being qualified. This process is controlled and documented by the qualification process described in Section H-1. A complete listing of active qualification cards, along with descriptions of training courses, are on file at the WIPP facility. Summaries of qualification cards and other job specific training courses are included in Permit Attachment H2. Waste handling personnel performing CH or RH TRU mixed waste handling tasks will be qualified to the applicable specific equipment or system qualification card on file at the WIPP facility.

Managers who have direct responsibility for supervising hazardous waste management personnel receive hazardous waste management training relevant to their positions. This training will include GET-19X/GET-20X and its refresher GET-19XA/GET-20XA, which is required for all employees, and the Hazardous Waste Worker Supervisor course HWS-101 and its refresher HWS-101A. In addition, a manager may also take HWW-101 and its refresher HWW-102 if these courses are determined to be useful for his/her position. These course descriptions are included in Permit Attachment H2. Managers who do not have direct hazardous waste management supervisory responsibilities receive training sufficient to ensure their awareness of hazardous waste management requirements and procedures; however, they do not perform hazardous waste management duties and their positions are not included in the appendices. As is the case with all WIPP facility employees, all managers receive RCRA overview training in GET-19X/GET-20X.

Security personnel are an important element of the safe and secure operations at the WIPP facility; however, they do not perform hazardous waste management functions during normal operations at the WIPP facility. Security personnel who serve as members of a Fire Support Team (see Section H-1e) receive emergency response training required of that team.

H-1e Training for Emergency Response

The WIPP facility training program ensures that personnel are able to respond appropriately and effectively to emergency situations. WIPP facility employees receive GET-19X/GET-20X, which includes instruction on hazard awareness, emergency preparedness, spill control, and the WIPP RCRA Contingency Plan (Permit Attachment F). This training ensures that every employee understands how to recognize real or potential emergencies and how to report such incidents to the proper WIPP facility officials. It also ensures that employees will not endanger themselves or others by taking actions beyond their ability. Emergency response personnel receive more extensive training in emergency response procedures as described in the next paragraph.

The WIPP facility emergency response organization is capable of providing emergency response services both above ground and underground. The Emergency Response Team (**ERT**), under the supervision of the Emergency Services Technician, has primary responsibility for above ground emergency response activities, and the First Line Initial Response Team (**FLIRT**) and the Mine Rescue Team (**MRT**) are responsible for underground emergency response activities. The responsibilities of these units are described in the WIPP RCRA Contingency Plan, Permit Attachment F. Members of these teams are volunteers from the WIPP organization. These teams receive thorough emergency response training before they are called upon to perform in real emergencies. This training includes firefighting elements, such as fire behavior, ladders, fire hose, fire streams, and ventilation. The FLIRT includes current qualification for unescorted underground access, National Fire Protection Association (**NFPA**) 600 Industrial Fire Brigades requirements, and additional qualifications pertaining to the team. MRT training includes current qualification for unescorted underground access, at least one year of underground work, Mine Safety and Health Administration requirements for medical and mine rescue, and additional qualifications pertaining to the team. ERT training includes NFPA 600 Industrial Fire Brigade requirements, and additional training pertaining to the team. In addition, all teams receive lifesaving elements, such as rescue, cardiopulmonary resuscitation and first aid, and other specific elements, such as self-contained breathing apparatus. A list of required training for these positions is included in each job position description in Permit Attachment H1.

Because these response teams are used for unusual occurrences and not routine hazardous waste handling, a RCRA position title is not included. A duty description is included which summarizes basic anticipated duties of these positions. Training records for these individuals are maintained in each individual's training file in Technical Training located at the WIPP site. These training requirements must be met prior to an individual serving in an emergency response function

Hazardous waste handling and emergency response personnel receive training that ensures their familiarity with emergency procedures, emergency equipment, and emergency systems including:

- Procedures for using and inspecting facility emergency and monitoring equipment
- Repairing and replacing facility emergency and monitoring equipment (RADCON only)
- Communications and alarm systems
- Response to fires or explosions
- Shutdown of operations.

Course outlines for emergency response training courses are provided in Permit Attachment H2.

The RCRA Emergency Coordinator receives training relevant to the RCRA Contingency Plan and must be familiar with the contents of the RCRA Contingency Plan prior to serving as RCRA Emergency Coordinator. Documentation of this training is maintained in the RCRA Emergency Coordinator's training file. All individuals qualified to serve as RCRA Emergency Coordinators are required to complete Contingency Plan training (SAF-645). RCRA Emergency Coordinators are notified of changes to the contingency plan by a document change notice, which is distributed weekly. This notice lists all of the controlled documents that have been changed during the week. Office wardens receive Office Warden Training (SAF-632) and are required to take an annual refresher. In addition, the training requirements of the Central Monitoring Room (**CMR**) operator are included in Permit Attachment H1. The CMR operator is listed in Permit Attachment F as an emergency response related position.

As there are no automatic waste feed systems at the WIPP facility, training on parameters for waste feed cut-off systems is not required. Similarly, as there is no potential for groundwater contamination incidents at the WIPP facility, training for responding to such incidents is not required.

H-2 Implementation of Training Program

The WIPP facility training program has been implemented to ensure that hazardous waste management and emergency response personnel employed at the WIPP facility receive the training indicated within the respective authorization cards. These authorization cards record training that the individual team members have completed. Personnel are trained on the RCRA Contingency Plan through their basic training. Newly hired employees receive the indicated training within six months of their date of hire or their transfer to a new position. Personnel do not work in unsupervised positions until they successfully complete the indicated training requirements. Hazardous waste management personnel attend annual refresher courses that review the initial training received and document knowledge transfer.

Records relating to the WIPP facility training program for hazardous waste management and emergency response personnel are maintained by the WIPP Technical Training Group located at the WIPP facility. These records include a roster of employees in hazardous waste management positions; a list of courses required for each position; course descriptions;

documentation when each employee has received and completed appropriate training; and all of the backup information regarding qualification and examination. Training records of current personnel are kept by the Technical Training Group until closure of the WIPP facility. Records of former employees are kept by the Technical Training Group for at least three years from the date the employee last worked at the facility.

FIGURES

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Figure H-1
Organizational Location of Training, Waste Handling, and Emergency Response Functions

ATTACHMENT H1

RCRA HAZARDOUS WASTE MANAGEMENT JOB TITLES AND DESCRIPTIONS

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ATTACHMENT H1

RCRA HAZARDOUS WASTE MANAGEMENT JOB TITLES AND DESCRIPTIONS

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ATTACHMENT H1

RCRA HAZARDOUS WASTE MANAGEMENT JOB TITLES AND DESCRIPTIONS

RCRA Hazardous Management Job Titles
Hazardous Waste Worker TRU Mixed Waste Handlers Underground Hazardous Waste Worker Site-Generated Waste Handlers Transportation Engineer WWIS Data Administrator Manager, Waste Handling Manager, Shipping Coordination
Radiological Control Technician Manager, Radiation Control
Technical Trainer Manager, Technical Training
Emergency Services Technician
Quality Assurance Technician Team Leader, Inspection Services Facility Inspection, Repair, and Service Team (FIRST) Leader Facility Inspection, Repair, and Service Team (FIRST)
Sampling Team Member Sampling Team Assistant Manager, Environmental Compliance
Facility Shift Engineer Facility Shift Manager Central Monitoring Room Operator
Waste Hoist Operator Waste Hoist Shaft Tender Waste Hoisting Manager
Chief Office Warden Assistant Chief Office Warden
Mine Rescue Team Member First Line Initial Response Team member Emergency Response Team Fire Brigade Fire Protection Technician
Radiographer (Radiography Independent Technical Reviewer) Visual Examination Expert (VE Independent Technical Reviewer) Permittees' Management Representative

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RCRA Hazardous Waste Management Job Descriptions

Position Title: Hazardous Waste Worker

Duties:

- Performs hazardous waste operations in accordance with WIPP procedures

Requisite Skills, Experience and Education:

Academic or vocational 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: TRU Mixed Waste Handlers

Duties:

- Operates waste handling equipment and support systems to unload, handle and emplace TRU mixed waste and backfill into the repository
- Performs functional and operational checks of waste handling equipment and support systems as well as conduct waste container storage area inspections
- Performs spot decontamination of shipping casks, waste containers, and waste handling equipment
- Perform waste container overpacking operations

Requisite Skills, Experience and Education:

Academic or vocational high school graduate with courses in algebra and physics or chemistry, or equivalent, plus two years of college-level technical study with courses in nuclear waste management and health physics, or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Waste Handling Operations Qualification Card Signature (WH-01A Backfill Technician, Floor, Yard, and Emplacement Technician, and WH-01B Waste Handling Technician or WH-02 Waste Handling Engineers) and Waste Handling Operations Guidebook (WH-GUIDE-1)
- Radworker II (RAD-201)
- Hazardous Waste Worker (HWW-101/102)
- Respiratory Protection (SAF-630/631)
- Hazardous Waste Responder (HWR-101, 101A)
- Hazardous Waste Transportation (HMT-102)
- Forklift Safety (EQP 402) (Once)
- Conduct of Shift Operations (OPS 115) (Once)
- Technical Safety Requirements (OPS 122) (Once)
- Incident Rigger (OPS 402) (Biennial)
- 40-Hour Inexperienced Miner (SAF 501/502) (Annual)
- Subject Matter Expert/On the Job Trainer (TRG 293/298) (Biennial)
- Waste Handling Systems (STC-003) (Once)

NOTE: Waste Handling Technicians will not participate in TRU waste handling activities and integrated system functions unsupervised until full qualification is acquired.

RCRA Hazardous Waste Management Job Descriptions

Position Title: Underground Hazardous Waste Worker

Duties:

- Move waste from generation point to waste hoist
- 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: Site-Generated Waste Handlers

Duties:

- Inspects and inventories site-generated hazardous waste staging areas
- Assists the transfer of site-generated hazardous waste to on-site staging areas
- Directs storage of site-generated hazardous waste in the hazardous waste staging areas
- Conducts inspections of Satellite Accumulation Areas

Requisite Skills, Experience and Education:

High school diploma.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Hazardous Waste Worker (HWW-101/102)
- Transportation of Hazardous Material (HMT-102)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Transportation Engineer

Duties:

- Supervise/oversee the preparation of hazardous waste shipments
- Review hazardous waste manifests and accompanying land disposal restriction notification forms for compliance
- Resolve manifest discrepancies
- Prepare hazardous waste manifests and supporting documentation for outgoing shipments of TRU mixed waste
- Provide generator sites with a signed copy of the hazardous waste manifest

Requisite Skills, Experience and Education:

Bachelors degree in engineering, or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Transportation of Hazardous Material (HMT-102)
- Hazardous Waste Worker (HWW-101/102)
- Radioactive Transportation Qualification Card (TE-01)
- Federal Motor Carrier Safety Regulations Qualification Card (TE-02)
- Hazardous Materials Qualification Card (TE-03)
- Hazardous Waste Shipments by Public Highway Qualification Card (TE-05)

RCRA Hazardous Waste Management Job Descriptions

Position Title: WWIS Data Administrator

Duties:

- Supervise the day to day operation of the WWIS
- Review and approve waste characterization, certification, and shipping data
- Manage the WWIS, including data change control, archival of the database, and reporting functions
- Review Waste Stream Profile Forms (WSPF) and compare with WWIS data on specific containers. Make approval/rejection recommendations to the WSPF review team

Requisite Skills, Experience and Education:

Bachelor of Science degree with technical courses in nuclear waste management, chemistry and health physics, or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- Subject Matter Expert/On-The-Job Training (TRG-293/298)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Manager, Waste Handling

Duties:

- Oversee all TRU waste and non-TRU waste handling activities conducted by Waste Operations personnel

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 (HWW-101/102)
- Hazardous Waste Worker Supervisor (HWS-101/101A)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Manager, Shipping Coordination

Duties:

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

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: Radiological Control Technician

Duties:

- Conducts routine surveys of all incoming shipping containers for radiation, contamination, and damage
- Conducts routine radiological surveys (monitoring for surface and airborne contamination and radiation exposure) of various areas at the WIPP site
- Serves as emergency response personnel for any event involving radiation and radioactive materials
- Oversees any radiological work at the facility. This duty involves writing radiological work permits (RWPs), issuing radiological protective clothing and supplemental dosimetry, conducting radiological monitoring of the job (including personnel, equipment, and areas involved), as well as providing any other radiological safety oversight function
- Monitors TRU waste handling and related operations, as well as any other radiological work, to determine compliance with radiological control documents and procedures
- Performs operational and functional checks of radiological detection and monitoring equipment
- In the unlikely event of personnel radiological contamination, the RadCon Tech is qualified to perform personnel decontamination and provide radiological oversight to medical personnel if an injury is contaminated
- Posts radiological areas with applicable signs and barriers
- Controls radioactive sources (including leak testing) used in the performance/functional checks and calibrations of radiological instrumentation
- Operates some non-radiological measurement equipment associated with radiological monitoring (gravimetric scale, chart recorders, data loggers, etc.)

Requisite Skills, Experience and Education:

Academic or vocational high school graduate, or equivalent, with courses in chemistry, physics, geometry, or trigonometry, or equivalent; associate degree in radiation safety or health physics preferred.

RCRA Hazardous Waste Management Job Descriptions (continued)

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Health Physics Technician Qualification (RCT-01/02)
- Radiological Worker II (RAD-201)
- Respiratory Protection (SAF-630/631)
- Hazardous Waste Worker (HWW-101/102)
- Hazardous Waste Responder (HWR-101/101A)
- Conduct of Shift Operations (OPS-115)
- First Aid/CPR (MED-101 or 101A)
- Electrical Safety (ELC 103) (Annual)
- Hazardous Material Transportation (HMT 102/103) (Biennial)
- 40-Hour Inexperienced Miner (SAF 501/502) (Annual
- compressed Gas Cylinder Safety (SAF 619) (Once)
- Fundamental Academic Lessons
- Site-Specific Academic Lessons

RCRA Hazardous Waste Management Job Descriptions

Position Title: Manager, Radiation Control

Duties:

- Supervises/oversees hazardous waste management duties performed by personnel in the Radiation Control section

Requisite Skills, Experience and Education:

B.S. degree in engineering, 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)
- Hazardous Waste Worker Supervisor (HWS-101/101A)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Technical Trainer

Duties:

- Conduct Hazardous Waste Management training

Requisite Skills, Experience and Education:

High school graduate with knowledge in areas of skills taught.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Hazardous Waste Worker (HWW-101/102)
- Level II Trainer (TRG-300)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Manager, Technical Training

Duties:

- Directs hazardous waste management training

Requisite Skills, Experience and Education:

B.S. degree and 5 years nuclear experience, or seven years nuclear training experience, 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)
- Level II Trainer (TRG-300)
- Subject Matter Expert/On-the-Job Training (TRG-293/298)
- Hazardous Waste Supervisor ((HWS-101)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Emergency Services Technician

Duties:

- Responds to hazardous waste spills in emergency situations
- Provides emergency fire-response services
- Conducts routine inspections and maintains all response equipment on site
- Directs emergency teams to control hazardous situations

Requisite Skills, Experience and Education:

Vocational or commercial high school graduate, or equivalent, plus additional training in emergency fire and medical response, or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- EST Qualification Card (EST-01)
- Subject Matter Expert/On-The-Job Training (TRG-293/298)
- Hazardous Waste Worker (HWW-101/102)
- Respiratory Protection (SAF-630/ 631)
- Firefighter I (SAF-621)
- Hazardous Waste Responder (HWR-101/101A)
- Incident Command Structure (ERT 113) (Once)
- Radiological Worker II (RAD 201) (Annual)
- 40-Hour Inexperienced Miner (SAF 501/502) (Annual)
- Heated Environment/Confined Space (SAF 515/515A) (Annual)
- Compressed Gas Cylinder Safety (SAF 619) (Once)

NOTE: The trainee may perform duties prior to qualification only for those evolutions and/or operations for which training has been completed.

RCRA Hazardous Waste Management Job Descriptions

Position Title: Quality Assurance Technician

Duties:

- Observes waste handling operations and verifies adherence with hazardous waste handling procedures

Requisite Skills, Experience and Education:

Vocational, technical or high school graduate, or equivalent, plus two years of technical training with courses in inspection techniques, 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)
- Quality Assurance Inspector Qualification Card

RCRA Hazardous Waste Management Job Descriptions

Position Title: Team Leader, Inspection Services

Duties:

- Ensures that items or services that do not conform with specified quality requirements are controlled to prevent use until disposition and corrective action, where applicable, are implemented
- Provides technical supervision for Quality Assessment Technicians inspecting and verifying waste handling operations

Requisite Skills, Experience and Education:

Associate of science degree in a technical field, 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)
- Hazardous Waste Worker Supervisor (HWS-101/101A)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Facility Inspection, Repair, and Service Team (FIRST) Leader

Duties:

- Oversee the packaging and shipment of hazardous and non-hazardous waste

Requisite Skills, Experience and Education:

High school graduate, or equivalent, supervisory experience and one year maintenance-related experience.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- Hazardous Waste Worker (HWW-101/102)
- Hazardous Waste Worker Supervisor (HWS-101/101A)
- Hazardous Materials and Waste Transportation (HMT-102, 103)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Facility Inspection, Repair, and Service Team (FIRST)

Duties:

- Support hazardous and non-hazardous waste packaging and shipments

Requisite Skills, Experience and Education:

High school graduate, or equivalent, and one year maintenance-related experience.
Maintain CDL Driver's License

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Hazardous Waste Worker (HWW-101/102) (Annual)
- Hazardous Materials and Waste Transportation (HMT-102, 103) (Biennial)

RCRA Hazardous Waste Management Job Descriptions

<u>Position Title:</u> Sampling Team Member

<u>Duties:</u>

- Collects samples of waste for characterization and environmental media for determination of possible releases

<u>Requisite Skills, Experience and Education:</u>

Academic or vocational high school graduate, or equivalent, with courses in algebra and chemistry or biology, plus Associate degree in engineering or science with courses in computer science, or equivalent.

<u>Training (Type/Amount):</u>

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Hazardous Waste Worker (HWW-101/102)
- Hazardous Waste Responder (HWR-101/101A)
- Sampling Team Qualification (ST-001)
- Respiratory Protection (SAF 630/631) (Annual)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Sampling Team Assistant

Duties:

- Assists sampling team members in the collection of waste samples for characterization and environmental media for determination of possible releases. Sampling Team Assistant will not respond to hazardous material spills.

Requisite Skills, Experience and Education:

Academic or vocational high school graduate, or equivalent, with courses in algebra and chemistry or biology, plus Associate degree in engineering or science with courses in computer science, 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)
- Sampling Team Assistant Qualification (STA-001)
- Respiratory Protection (SAF 630/631) (Annual)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Manager, Environmental Compliance

Duties:

- Supervises/oversees hazardous duties performed by Sampling Team members

Requisite Skills, Experience and Education:

B.S. degree in an environmental science, 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)
- Hazardous Waste Supervisor (HWS-101/101A)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Facility Shift Engineer

Duties:

- Notifies emergency response personnel and on-call facility manager during emergency occurrences
- Serves as backup RCRA Emergency Coordinator

Requisite Skills, Experience and Education:

Associate degree in engineering or scientific discipline, or equivalent, and five years related practical experience, or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Facility Operations Shift Supervisor Qualification Card (FO-FOSE-3 or FO-FOSE-3R)
- Roving Watch Qualification (FO-RW-1)
- Central Monitoring Room Operator Qualification (FO-CMRO-2)
- Conduct of Shift Operations (OPS-115)
- Hazardous Materials Emergency Response (HMT-104)
- Root Cause Analysis (TRG-296)
- WIPP Occurrence Reporting for Facility Managers (OPS-110)
- WIPP Contingency Plan Procedure (SAF-645)
- Hazardous Waste Worker (HWW-101)

NOTE: Full Qualification must be completed prior to the candidate operating any equipment or performing any operating evolutions without the direct supervision of a qualified operator.

RCRA Hazardous Waste Management Job Descriptions

Position Title: Facility Shift Manager

Duties:

- Serves as RCRA Emergency Coordinator
- Notifies emergency response personnel and on-call facility manager during emergency occurrences

Requisite Skills, Experience and Education:

Academic or vocational high school (mechanical/electrical) graduate and eight years of nuclear plant operating experience, or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Facility Operations Shift Engineer Qualification Card (FO-FOSE-3 or FO-FOSE-3R)
- Roving Watch Qualification (FO-RW-1)
- Central Monitoring Room Operator Qualification (FO-CMRO-2)
- Conduct of Shift Operations (OPS-115)
- Hazardous Materials Emergency Response (HMT-104)
- Root Cause Analysis (TRG-296)
- WIPP Occurrence Reporting for Facility Managers (OPS-110)
- WIPP Contingency Plan Procedure (SAF-645)
- Hazardous Waste Worker (HWW-101)

NOTE: Full Qualification must be completed prior to the candidate operating any equipment or performing any operating evolutions without the direct supervision of a qualified operator.

RCRA Hazardous Waste Management Job Descriptions

Position Title: Central Monitoring Room Operator

Duties:

- Notifies emergency response personnel
- Documents emergency actions

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)
- Roving Watch Qualification (FO-RW-1)
- Central Monitoring Room Operator (FO-CMRO-2 or FO-CMRO-2R)
- Hazardous Materials Emergency Response (HMT-104)
- Conduct of Shift Operations (OPS-115)

NOTE: Full Qualification must be completed prior to the candidate operating any equipment or performing any operating evolutions without the direct supervision of a qualified operator.

RCRA Hazardous Waste Management Job Descriptions

Position Title: Waste Hoist Operator

Duties:

- Operates waste shaft hoist in accordance with established procedures
- Maintains daily hoist operations log
- Performs routine inspections of the Waste Shaft hoisting equipment

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 Qualification (M-30)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Waste Hoist Shaft Tender

Duties:

- Oversees and directs loading and unloading of the Waste Hoist 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)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Waste Hoisting Manager

Duties:

- Coordinate and direct the daily operations and maintenance of the operating hoist and shaft
- Supervise/oversee hazardous waste management duties performed by hoisting personnel

Requisite Skills, Experience and Education:

B.S. degree, 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)
- Hazardous Waste Worker Supervisor (HWS-101/101A)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Chief Office Warden

Duties:

- Cooperate, participate, and comply with the provisions of WIPP Emergency Plan
- Primary function is to coordinate personnel accountability in the event of an evacuation
- Responsible for surface accountability at staging areas in the event of an evacuation

Requisite skills, Experience and Education:

High School Diploma or equivalent, approval from employee's manager, compliance with the requirements of the WIPP Emergency Plan, and current knowledge of emergency evacuations, staging and assembly areas, and the site notification system.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Office Warden Training (SAF-632)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Assistant Chief Office Warden

Duties:

- Cooperate, participate, and comply with the provisions of WIPP Emergency Plan
- Primary function is to coordinate personnel accountability in the event of an evacuation
- Responsible for surface accountability at staging areas in the event of an evacuation

Requisite skills, Experience and Education:

High School Diploma or equivalent, approval from employee's manager, compliance with the requirements of the WIPP Emergency Plan, and current knowledge of emergency evacuations, staging and assembly areas, and the site notification system.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Office Warden Training (SAF-632)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Mine Rescue Team Member

Duties:

- Cooperate, participate, and comply with provisions of the WIPP Emergency Management Program (WP 12-9)
- Trained in accordance with 30 CFR to respond to mine emergencies beyond that of the FLIRT
- Responsible for underground reentry and rescue after an underground evacuation

Requisite Skills, Experience and Education:

High School Diploma or equivalent, written approval from employee's manager (Authorization Card MRT-01), compliance with health and physical requirements, 1) Initial examination and clearance by the Occupational Medical Director, 2) Examined and cleared annually by the Occupational Medical Director, 3) Additional tests: pulmonary function test, cardiac stress test every five years, drug screen, 4) Encouraged to maintain good medical and physical condition, Compliance with requirements of the SERP, current knowledge regarding rescue and recovery of personnel involved in mine emergencies according to 30 CFR. At least one year verifiable underground work.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- First Aid and CPR (MED-101)
- Respiratory Protection (SAF-630/SAF-631 D)
- Radiological Worker II (RAD-201)
- Mine Rescue Team Initial training (EOC-101)
- Inexperienced Miner Training (SAF-501/502)
- Compressed Gas Cylinder Safety (SAF 619) (Once)

RCRA Hazardous Waste Management Job Descriptions

Position Title: First Line Initial Response Team member

Duties:

- Cooperate, participate, and comply with provisions of the Supplemental Emergency Response Program Plan (SERP)
- Primary function is to provide medical and hazardous material response to the WIPP underground

Requisite Skills, Experience, and Education:

High School Diploma or equivalent, written approval from employee's manager (Authorization Card FLIRT-01), compliance with health and physical requirements, 1) Initial examination and clearance by the Occupational Medical Director, 2) Examined and cleared annually by the Occupational Medical Director, 3) Additional tests: pulmonary function test, cardiac stress test every five years, drug screen, 4) Encouraged to maintain good medical and physical condition, compliance with requirements of the SERP, current knowledge regarding medical response and hazardous materials response.

Training (Type/Amount):

The following training must be completed and current prior to participation during an emergency response:

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA)
- Inexperienced miner (SAF 501/502)
- Confined Space Training (SAF-515)
- Hazardous Waste Worker (HWW-101)
- Respiratory Protection (SAF-630 and SAF-631 D)
- First Aid and CPR (MED-101)
- Radiological Worker II (RAD-201)
- Confined Space Rescue (ERT 102/102A) (Annual)
- Annual Live Fires Practical (ERT 107) (Annual)
- Introduction to Firefighting (ERT 117) (Once)
- Eight hours of training quarterly
- Hazardous Waste Responder (HWR 101/101A)(Annual)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Emergency Response Team

Duties:

- Responding to hazardous waste incidents or releases due to fires, HAZMAT, and medical emergencies
- Operating as part of the WIPP Supplemental Emergency Response Program

Requisite Skills, Experience, and Education:

High School Diploma or equivalent, written approval from employee's manager (Authorization Card ERT-01), compliance with health and physical requirements:
1) Initial examination and clearance by the Occupational Medical Director
2) Examined and cleared annually by the Occupational Medical Director
3) Additional tests: pulmonary function test, cardiac stress test every five years, drug screening.

Training (Type/Amount):

- Emergency Response Team (ERT-102/102A) (Annual)
- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA) (Annual)
- Hazardous Waste Worker (HWW-101/102) (Annual)
- Hazardous Waste Responder (HWR-101/101A) (Annual)
- Respiratory Protection (SAF-630/ SAF-631C/ SAF-631 D) (Annual)
- First Aid and CPR (MED-101/101A) (Annual)
- Radiological Worker (RAD-201/202) (Annual)
- Confined Space/Heated Environment (SAF-515/515A)
- Emergency Response Team Member Authorization Card (ERT-01)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Fire Brigade

Duties:

- Fight fires

Requisite Skills, Experience, and Education:

High School Diploma or equivalent, fire fighting training, compliance with health and physical requirements:
1) Initial examination and clearance by the Occupational Medical Director.
2) Examined and cleared annually by the Occupational Medical Director.
3) Encouraged to maintain good medical and physical condition.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA) (Annual)
- Hazardous Waste Worker (HWW-101/102) (Annual)
- Hazardous Waste Responder (HWR-101/101A) (Annual)
- Radiological Worker (RAD-201/202) (Annual)
- Respiratory Protection (SAF-630/ SAF-631D) (Annual)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Fire Protection Technician

Duties:

- Responds to hazardous waste spills in emergency situations
- Provides emergency fire-response service
- Conducts routine inspections and maintains all response equipment on site
- Serves as incident commander
- Directs emergency teams to control hazardous situations

Requisite Skills, Experience, and Education:

Vocational or commercial high school graduate, or equivalent, plus additional training in emergency fire and medical response, or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-19XA/GET-20XA) (Annual)
- Hazardous Waste Worker (HWW-101/102)
- Hazardous Waste Responder (HWR-101/101A)
- Radiological Worker (RAD-201/202)
- Respiratory Protection (SAF-630/ SAF-631D)
- Fire Protection Technician Qualification Card (FTP-01)

RCRA Hazardous Waste Management Job Descriptions

Position Title: Radiographer (Radiography Independent Technical Reviewer)

Duties:

- Performs confirmation of waste using radiography
- Reviews radiography record performed by another radiographer

Requisite Skills, Experience and Education:

Academic or vocational high school diploma or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-20XA)
- Radworker II (RAD-201)
- Hazardous Waste Worker (HWW-101/102)
- Respiratory Protection (SAF-630/631)
- Conduct of Shift Operations (OPS 115) (Once)
- Technical Safety Requirements (OPS 122) (Once)
- Subject Matter Expert/On the Job Trainer (TRG 293/298) (Biennial)
- Waste Handling Systems (STC-003) (Once)
- Radiography Training

RCRA Hazardous Waste Management Job Descriptions

Position Title: Visual Examination Expert (VE Independent Technical Reviewer)

Duties:

- Performs confirmation of waste using visual examination or review of visual examination records
- Reviews visual examination or visual examination record review performed by another Visual Examination Expert.

Requisite Skills, Experience and Education:

Academic or vocational high school diploma or equivalent, plus two years of college-level technical study with courses in nuclear waste management and health physics, or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-20XA)
- Radworker II (RAD-201)
- Hazardous Waste Worker (HWW-101/102)
- Respiratory Protection (SAF-630/631)
- Conduct of Shift Operations (OPS 115) (Once)
- Technical Safety Requirements (OPS 122) (Once)
- Subject Matter Expert/On the Job Trainer (TRG 293/298) (Biennial)
- Waste Handling Systems (STC-003) (Once)
- Visual Examination

RCRA Hazardous Waste Management Job Descriptions

Position Title: Permittees' Management Representative

Duties:

- Reviews radiography and/or visual examination to certify that waste confirmation is complete and that waste contains no ignitable, corrosive, or reactive waste

Requisite Skills, Experience and Education:

Academic or vocational high school diploma or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-20X)
- General Employee Training Refresher (GET-20XA)
- Radworker II (RAD-201)
- Hazardous Waste Worker (HWW-101/102)
- Respiratory Protection (SAF-630/631)
- Conduct of Shift Operations (OPS 115) (Once)
- Technical Safety Requirements (OPS 122) (Once)
- Subject Matter Expert/On the Job Trainer (TRG 293/298) (Biennial)
- Waste Handling Systems (STC-003) (Once)
- Radiography Training
- Visual Examination Training

ATTACHMENT H2

TRAINING COURSE AND QUALIFICATION CARD OUTLINES

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ATTACHMENT H2

TRAINING COURSE AND QUALIFICATION CARD OUTLINES

TABLE OF CONTENTS

Course Outlines

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COURSE: GET-19X/GET-20X - General Employee Training

DURATION: . 16 Hours

PREREQUISITES: None

SCOPE:

TYPE: Classroom

OBJECTIVES: Upon completion of this course, the student will be able to perform their job in a safe manner and will have an overview of the site organization and description.

Mastery of the terminal objectives will be demonstrated by scoring 80 percent or higher on the course examination.

REFRESHER: GET-19XA/GET-20XA annually

COURSE DESCRIPTION (by module)

1. Site Overview & WIPP Description . 1 hour	a. Mission of DOE and CBFO b. Relationship of WIPP organizations c. Surface structures d. WIPP shafts e. Underground area
2. Emergency Preparedness (includes Occurrence Reporting) . 1 hour	a. Definition of occurrence b. DOE Order 5000.3B c. WP 12-ES3918 d. Occurrence reporting process e. Employee involvement with Emergency Preparedness f. Types of emergencies g. Emergency response by WIPP groups h. Off-site response groups i. WIPP emergency procedures j. Emergency equipment k. Employee actions during emergencies
3. General Safety . 1 hour	a. Personal Protective Equipment b. Requirements for PPE c. Warning Tags d. WIPP safety hazards e. Medical assistance

		f.	Actions to take for injuries		
		g.	Reporting injuries/accidents		
		h.	Employee concerns		
4.	Computer Security .1 hour	a.	Department to contact		
		b.	WIPP policies and procedures for:		
				1.	Personally owned software
				2.	Computer games
				3.	Passwords/password protection
		c.	Computer virus prevention		
5.	Fire Protection .1 hour	a.	WIPP Fire Protection Program		
		b.	Fire sources at WIPP		
		c.	Fire Tetrahedron		
		d.	Classes of fires		
		e.	Fire extinguisher		
		f.	Office Warden Program		
		g.	Employee responsibilities during a fire		
6.	RCRA & Storm Water Management .2 hours	a.	RCRA history		
		b.	RCRA goals		
		c.	WIPP goals and relation to RCRA		
		d.	Definition of RCRA wastes		
		e.	Site generated waste program		
		f.	Training requirements for treatment storage and disposal facilities		
		g.	Contingency Plan		
		h.	Waste Minimization Program		
		i.	RCRA regulatory agencies		
		j.	RCRA enforcement options		
		k.	Application of Storm Water Management policy in relation to the general employee		
8.	Work Policies and Procedures .1 hour	a.	DOE Orders and MOC Procedures		
		b.	Teamwork		
		c.	Conduct of Operations Policy		
				1.	Elements of Conduct of Ops
		d.	Quality Assurance Program		
		e.	Responsibility for following procedures		
		f.	Resuming work after stoppage		
		g.	Stopping work for unsafe acts		
		h.	Purpose and uses of "Hold Tag"		
		i.	Quality records and requirements		

		j.	Correcting errors on QA Records
		k.	Configuration Management and affected departments
9.	Electrical Safety .1 hour	a.	Variables of electrical circuits
		b.	Severity of electrical shock
		c.	Areas where electrical accidents occur
		d.	WIPP policy on using damaged electrical equipment
		e.	WIPP policy for modifying electrical protective devices
		f.	Requirements for use of Ground Fault Interrupters.
		g.	Purpose of GFI's
		h.	WIPP policy for resetting breakers
		i.	WIPP policy for using extension cords, plug-in devices, and other equipment exposed to energized electrical circuits
10.	Hazard Communications .1 hour	a.	Description of Haz Comm Std.
		b.	Health and Safety hazards
		c.	Protection from workplace hazards 1. PPE 2. Preparedness/Prevention 3. Employee responsibilities
		d.	Emergency procedures
		e.	WIPP Hazard Communication Prog. 1. Training 2. Container labels 3. Chemical transfers 4. Material Safety Data Sheets
		f.	Other information sources
11.	Personal Protective Equipment .1 hour	a.	Requirements for head protection
		b.	Requirements for hearing conservation
		c.	Requirements for face/eye protection
		d.	Requirements for foot protection
12.	Bloodborne Pathogens .1 hour	a.	Def. of Bloodborne Pathogens
		b.	Def. of Hepatitis B and Human Immunodeficiency Virus
		c.	Bloodborne Pathogen transmission
		d.	Prevention of bloodborne pathogen infection

e. WIPP Exposure Control Plan

13. Ergonomics
. 2 hours
a. Cumulative Trauma Disorder
b. Risk factors for CTD
c. Prevention of CTD
d. Recognition of CTD
e. Steps to take when CTD develops

14. Security
. 1 hour
a. Security Mission
b. Def. of Security Officer
c. Security Officer Tasks
d. Access and Property Control at WIPP
e. Badge accountability
f. Property Pass system
g. Physical security
h. Telephone threat list
i. Employee responsibilities during demonstration
j. Fitness for duty
k. Computer security
l. Parking requirements

15. General Employee Radiological Training (GERT)
. 1 hour

This program will be implemented prior to declaration of site readiness for all site employees. The standardized core materials for GERT include the following topics:

Sources of Radiation
Non-ionizing and Ionizing Radiation
Risk in Perspective
ALARA Concept
Radiological Controls
Monitoring/Dosimetry
Emergency Procedures
Employee Responsibilities

All times are approximate and do not reflect time spent on additional topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: GET-19XA/GET-20XA - General Employee Training Refresher

DURATION: Self-paced Course

PREREQUISITES: None

SCOPE:

TYPE: Self-paced Module

OBJECTIVES: Objectives are stated at the beginning of each module, including security, radiological basics, general safety, hazard communications, bloodborne pathogens, hearing protection, and OSHA/RCRA.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the module examination.

REFRESHER: Annually

COURSE DESCRIPTION (by module)

1. Introduction
   a. Self Paced Course
   b. Information about WIPP organizations
   c. Appendix Information
      1. Storm Water Management
      2. WIPP Land Withdrawal Act
      3. DOE Mission
   d. Exam Guidelines

2. General Security
   a. Prohibited Articles
   b. Primary responding agencies
   c. Wearing your badge
   d. Escort Responsibility
   e. Number of visitors an employee may escort
   f. When to turn off your computer
   g. Personal Property Passes

3. Computer Security
   a. Point of contact
   b. WIPP policies and procedures for:
      1. Personally owned software
      2. Computer games
      3. Passwords/password protection
   c. Computer virus prevention

4. Fitness for Duty	a. Reasons for the Fitness for Duty Program b. General Employee Responsibilities
5. RCRA	a. Types of waste disposed b. Waste Identification
6. Storm Water Management	a. Application of Storm Water Management policy in relation to the general employee
7. Bloodborne Pathogens	a. Transmission Identification of Bloodborne Pathogens b. Prevention of Hepatitis B and Human Immunodeficiency Virus c. Actions to take if exposed
8. Hazard Communications	a. Purpose of MSDS b. Responsibilities when transferring hazardous materials c. WIPP Hazard Communication Prog. 1. Training 2. Container labels 3. Chemical transfers 4. Material Safety Data Sheets
9. Ergonomics	a. Identification of CTD b. Ways to prevent CTD c. Required actions
10. Personal Protective Equipment	a. Requirements for head protection b. Requirements for hearing conservation c. Requirements for face/eye protection d. Requirements for foot protection
11. General Safety	a. Requirements for obeying signs and tags b. Requirements for reporting an occurrence c. Actions for emergency situations d. Resolving employee concerns e. Proper uses of extension cords f. WIPP Circuit Breaker Policy g. Steps to take when responding to fire h. Responsibilities when fighting a fire

	i. When to use the sign-out board
12. Conduct of Operations	a. Goals of In-House Management Program b. Required actions before posting information c. Correcting a written record d. Point of Contact for Records Management

COURSE: HWW-101 - Hazardous Waste Worker

DURATION: . 24 hours

PREREQUISITES: None

SCOPE:

REFRESHER: HWW-102 Annually

COURSE DESCRIPTION (by module)

1. Course and Regulatory Overview . 1 hour	a. OSHA regulations and their applicability to RCRA facilities and operations b. RCRA standards for generator facilities and for TSDFs c. DOT/EPA regulations and applicability to hazardous waste transportation
2. Hazard Communications . 1 hour	a. Purpose of the Hazard Communication standard (29 CFR 1910.1200) b. Locations of Material Safety Data Sheets (MSDS) c. Labeling of containers d. Other resources for information on hazardous materials/waste including NFPA 704 hazard warning symbol, DOT United Nations Identification System, DOT Emergency Response Guidebook, NIOSH Pocket Guide to Chemical Hazards. Student exercises are included in this section on the use of these references.
3. Principles of Toxicology . 3 hours	a. Dose-response relationship with regard to exposures to hazardous materials b. Immediate and delayed effects (acute and chronic effects) c. Different ways substances enter the human body d. Effects of substances on the human body including target organ effects, systemic effects, carcinogens, and genetic effects

		e.	Exposure limits including Threshold Limit Value (TLV), Permissible Exposure Limit (PEL), Lethal Dose 50% (LD_{50}), Lethal Concentration 50%(LC_{50})
		f.	Effects of temperature extremes on the human body including signs and symptom heat stress and cold stress
		g.	Effects of ionizing radiation
4.	Hazards . 3 hours	a.	Safety and health hazards when conducting hazardous waste operations including fire, explosion, oxygen deficiency, ionizing radiation, biological, electrical, heat and cold stress
		b.	Hazard classification including chemical, physical, mechanical, biological, and radiological
		c.	Airborne hazards including gases, vapors, and particulates
		d.	Properties of materials including corrosivity, pH, flammability, explosivity, (upper and lower explosive limits), specific gravity, vapor density, boiling point, solubility, and reactivity
		e.	Protection from hazards
		f.	Confined space hazards
		g.	Causes and prevention of accidents
5.	Personal Protective Equipment . 3 hours	a.	Description and examples of Personal Protective Equipment (PPE)
		b.	Factors in the selection of PPE
		c.	Non-radiological and radiological hazards
		d.	Selection process for PPE
		e.	Ways substances enter PPE including permeation, degradation, penetration
		f.	Equipment included in each of the four levels of PPE adopted by the EPA (Levels A, B, C, and D), capabilities and limitations of each level
		g.	PPE inspection
		h.	Job scope planning

i. Human factors that limit the use of PPE
j. Demonstration on donning and removal of Level D PPE. Students perform a Level D dress out sequence and are evaluated by a Job Performance Measure.

6. Satellite Accumulation Areas . 2 hours

a. Purpose of hazardous waste satellite accumulation areas (proper accumulation of hazardous waste to protect human health and the environment)
b. Key elements of satellite accumulation areas including maintenance of containers, labeling, maximum quantities allowed, and transfers to storage area
c. Inspection criteria including aisle space, stacking of containers, closing of containers, labeling requirements, containment structures, housekeeping, warning signs, alarms, fire extinguisher, spill control materials, and ignition sources

7. Decontamination . 2 hours

a. Purpose of decontamination (prevent the spreading of contamination, prevention of exposure to workers, protection of the environment)
b. Causes and prevention of worker contamination
c. Decontamination planning including methods for decontaminating
d. Layout of decontamination stations
e. Emergency decontamination procedures

All times are approximate and do not reflect time spent on additional topics that arise due to class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: HWW-102 - Hazardous Waste Worker Refresher

DURATION: 8 hours

PREREQUISITES: HWW-101

SCOPE: This course reviews precautions for safe handling and use of a hazardous material and the management of any hazardous waste generated during the these activities. This is accomplished by reviewing the concepts presented in HWW-101 and the application to a particular hazardous material by the use of a Material Safety Data Sheet (MSDS). Also included in this course is an overview of mixed waste.

TYPE: Classroom and Practical

COURSE DESCRIPTION (by lesson)

1. Material or Waste Information .2 hours
   a. Definition of TRU mixed waste
   b. Emergency actions in the event of a spill or leaking or punctured container of TRU mixed waste
   c. This module describes the information found in the supplier information section of a Material Safety Data Sheet (MSDS)
   d. This information is used in the event the user of the material needs more information than what is included in the particular MSDS
   e. Information
      1. This module describes the product's individual ingredients, relative concentration, and the exposure limit for each ingredient
   f. Physical/Chemical Data
      1. This module describes the chemical and physical properties of the material including; boiling point, specific gravity, melting point, vapor pressure, vapor density, evaporation rate, solubility, pH, and volatility

2. Hazard Data
   a. This module describes the fire and

.2 hours			explosion hazards of the particular material including; flash point, lower explosive limit, upper explosive limit, auto-ignition temperature, NFPA 704M Hazard Classification Rating, fire extinguishing media, special fire fighting procedures, unusual fire and explosion hazards, toxic gases produced, and explosion data
		b.	Reactive Data Module 1. This module describes the material's reactivity characteristics including stability, incompatibility, decomposition, and polymerization
		c.	Health Hazards Data Module 1. This module describes the different ways the user may be exposed to the material and the adverse effects the material may have on the body including; lethal dose 50% (LD_{50}), lethal concentration 50 % (LC_{50}), target organ effects, carcinogenicity, acute and chronic effects, and emergency first aid procedures
3.	Safety .2 hours	a.	This module describes the precautions for the safe handling of the material including steps to take in the event the material is spilled, waste disposal method (EPA hazardous waste numbers), regulatory requirements (SARA Title III hazard categories/lists and CERCLA Hazardous Substance classification), labeling of containers, protective equipment, and site specific requirements
		b.	Control Measures Module 1. This module describes safety control measures to take when using the material including respiratory protection, ventilation requirements,

work/hygiene practices and site specific requirements

c. Personal Protective Equipment Module

1. This module describes the purpose of personal protective equipment (PPE), the categories of protection, EPA Levels of Protection (A,B,C,D), PPE material and chemical resistance. In this module the donning and doffing of Level D PPE is demonstrated. The students are given an opportunity to practice and then are evaluated by completion of a Job Performance Measure.

4. Demonstration .1 hour

a. The effects the hazardous material has on various types of PPE material (degradation, permeation, and penetration effects), other common materials and neutralization effects are demonstrated

All times are approximate and do not reflect additional time spent on topics that arise due to class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: HWR-101 - Hazardous Waste Responder

DURATION: 20 hours

PREREQUISITES: GET-19X/GET-20X
Medical Physical
SAF 630/631- Respiratory Protection
HWW 101 - Hazardous Waste Worker

SCOPE: The instructor will present updated information needed for personnel who respond to hazardous material and/or hazardous waste emergencies at the WIPP site.

TYPE: Classroom and Field Exam

OBJECTIVE: Upon completion of this course, the student will be able to respond to hazardous materials emergencies at the WIPP site

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the post course examination, satisfactory performance on the job performance measure for donning and doffing Personal Protective Equipment, and participate as a team in the final practical.

REFRESHER: HWR-101A Annually

COURSE DESCRIPTION

1. Regulatory Requirements .1 hour	a. 29 CFR 1910.120
2. Evaluation of Incident .3 hours A. (Types of Information)	a. Physical data 1. color 2. odor 3. sound b. Cognitive c. Technical
B. Dispatch and Initial Response Phase	a. Primary focus information b. CMR information c. During a response
C. Product Information	a. Product identification b. Primary and secondary hazards
D. Incident Elements	a. Spill b. Leak c. Fire

E. Incident Priorities

3. Response Operations
.1 hour

A. Size-up, Strategy, and Tactics
- a. Size-up
  - 1. Monitoring atmospheric conditions near the release
    - a. Weather conditions
    - b. Organic vapors, gases, particulates
    - c. Oxygen deficiency
    - d. Specific materials
    - e. Combustible gases
    - f. Inorganic vapors, gases, particulates
    - g. Radiation
  - 2. Visual observations
  - 3. Unusual odors
  - 4. Off-site samples
  - 5. Entry team procedures
    - a. Monitoring on-site ambient air
    - b. Types of containers and impoundments
    - c. Physical condition of material
    - d. Leaks or discharges
    - e. Labels and markings
  - 6. Additional considerations
    - a. Type, condition, and behavior of container
    - b. Resources and control measures
  - 7. Summary of size-up
- b. Strategy and tactics
  - 1. Definitions
  - 2. Strategy
  - 3. Tactics
  - 4. Rescue
  - 5. Prevent container failure
  - 6. Containment
  - 7. Confinement
  - 8. Remove ignition sources
  - 9. Extinguish fires
  - 10. Tactical withdrawal

B. Incident Command System and Mitigation Plan at the WIPP
- a. Key elements required
- b. Key personnel and functions

.1 hour

1. Incident commander
2. Science officer
3. Safety officer
4. Records keeper
5. Medical officer
6. Resource officer
7. Operations officer

c. Implementing response operations
    1. Organize
    2. Evaluate the situation
    3. Develop a plan of action

4. Safety
   .5 hours

   A. Responder Protection
      a. Pre-entry evaluation
      b. Deny entry
      c. Hydration
      d. Pre-entry briefing
      e. Post-exit evaluation
      f. Support location
      g. Environmental temperature monitoring

   B. Personal Protective Equipment
      a. Selection of appropriate PPE
         1. Levels
            a. Level A
            b. Level B
            c. Level C
            d. Level D
         2. Optional equipment
         3. Manufacturer recommendations/testing
            a. Gloves

   C. Donning and Doffing Level A PPE

   D. Job Performance Measures
      a. Students will Don and Doff Level A PPE with a partner

   E. Decontamination

   F. Emergency Medical Services

5. Table-top Drill
   .2 hours

6. Course Review

7. Written Examination

8. Practical
.5 hours

a. Objective
b. Demonstration
c. Equipment needed
d. Have students develop Incident Commander and System
e. Evaluation

All times are approximate and do not reflect time spent on additional topics that arise due to class participation, student breaks, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: HWR-101A - Hazardous Waste Responder, Refresher

DURATION: . 8 hours

PREREQUISITES: HWR-101

OBJECTIVES: Upon Completion of this course, the student will be able to respond to hazardous materials emergencies at the WIPP site.

Mastery of the terminal objective will be demonstrated by satisfactory performance on the job performance measure for donning and doffing Personal Protective Equipment (PPE), and successfully participate as a team in the final practical

REFRESHER: Annually

COURSE DESCRIPTION

1. Review of HWR-101
   . 2 hours

2. Changes in Regulations, procedures, and polices
   . 2 hours

3. Lessons Learned
   . 2 hours

4. Conclusion and Exam
   . 2 hours

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size and/or practical exercises (i.e., Job Performance Measures)

COURSE: HWS-101 - Hazardous Waste Worker Supervisor

DURATION: .8 hours

SCOPE: This course will provide the students with the knowledge necessary to identify factors affecting individual and corporate liability under applicable hazardous waste laws and regulations. Students will be able to state the stages of criminal and civil litigation, identify the types of behavior that leads to criminal prosecution, and identify appropriate actions to ensure compliance with applicable hazardous waste operations.

TYPE: Classroom

OBJECTIVES: Upon completion of this course, the student shall be able to perform supervisory functions in compliance with policies, procedures, and regulations, with regard to hazardous waste management.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination.

REFRESHER: HWS 101A annually

COURSE DESCRIPTION (by lesson)

1. Liability and Responsibility
   .3 hours
   - a. General requirements
   - b. Definitions and key liability concepts
   - c. Mental element in criminal litigation
   - d. Typical litigation chronology
   - e. Civil and criminal penalties under OSHA
   - f. Criminal penalties under environmental laws
   - g. Federal sentencing guidelines
   - h. Mitigation credit under Federal Sentencing Guidelines
   - i. Who will be defendants
     1. Direct involvement
     2. Direct supervisory involvement
     3. Indirect involvement and Responsible Corporate Officer doctrine
   - j. Representation
   - k. Indemnification
   - l. Scope of employment
   - m. Types of criminal cases being pursued
   - n. Recommended actions
   - o. Illustrative cases

1. Knowledge
2. Sovereignty
3. Multiple prosecutions
4. Pervasiveness of liability
5. Potential for catastrophic corporate consequences

p. Conclusions

2. Health and Safety Program . 3 hours	a. Purpose b. Authority c. Supervisor responsibilities 1. Hazard control 2. Hazardous waste management 3. Hazardous materials management a. Training b. Storage and handling c. Labeling containers d. General precautions and practices d. Personal protective equipment
A. Industrial Hygiene	a. Exposure limits b. Conversion and comparison of PPM
B. Spill Containment (Emergency Response)	a. Spill response plan
C. Site Control	a. Zoning
D. Decontamination	
E. Reporting Requirements	
3. Conclusion . 1 hour	

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises (i.e. Job Performance Measures)

COURSE: HWS-101A - Hazardous Waste Worker Supervisor-Refresher

DURATION: . 8 Hours

PREREQUISITES: HWS-101

TYPE: Classroom

OBJECTIVES: Upon completion of this course, the student will be able to perform supervisory functions in compliance with policies, procedures, and regulations with regard to hazardous waste management

Mastery of the terminal objective will be demonstrated by scoring 80% or higher on the course examination.

REFRESHER: Annually

COURSE DESCRIPTION (by lesson)

1. Review of HWS-101
   . 2 hours
   a. Liability and Responsibility
   b. Health and Safety Program

2. Changes in regulations, procedures, policies
   . 2 hours

3. Lessons Learned
   . 2 hours

4. Conclusion and Exam
   . 1 hour

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises (i.e. Job Performance Measures)

COURSE: SAF-630/631 - Respiratory Protection

DURATION: .8 hours

PREREQUISITES: Medical physical

TYPE: Classroom and Practical

SCOPE: This program contains the requirements of respiratory protection as outlined in 29 CFR 1910.134, 10 CFR 20, ANSI, Z88.2-1980 and applicable WIPP procedures.

OBJECTIVE: Upon completion of this course the trainee will demonstrate a knowledge of the WIPP respiratory protection program; respiratory health hazards; and types of respiratory protection devices, their proper use and limitations.

Mastery of the terminal objective will be demonstrated by scoring 80% or higher on a closed book lesson examination.

COURSE DESCRIPTION (by lesson)

1. Introduction
   .2 hours
   A. Basic Requirements
      a. Regulations
      b. DOE Orders
      c. Industry Standards
      d. WIPP Procedures
         1. Physical exam
         2. Pulmonary test
         3. Training
         4. Fit Testing
         5. Identification of potential respirator activities
         6. Selection of Respirators
         7. Respirator usage, storage and sanitation

B.	Nature, Extent, and Effects of Respiratory Hazards and the Need for Protection	a.	Human Respiratory System
		b.	Respiratory Hazards
		c.	Contaminants (Identification)
			1. Physical Properties
			2. Chemical Properties
			3. Concentration
			4. Warning Properties
			5. MSDS
			6. Toxicology
			a. Gases/Vapors
			b. Particulates
C.	Engineering and Administrative Controls	a.	Hazard Control
			1. Engineering Controls
			2. Administrative Controls
		b.	ALARA

2. Use of Respirators at WIPP
.2 hours

A.	Selection of Respirators	a.	Medical Verification
			1. Physical Exam
			2. Spirometer Testing
		b.	Training
		c.	Qualitative/Quantitative Fit Testing
		d.	Selection Factors
			1. User Acceptance
			2. Psychological/Physiological Complications
B.	Air Purifying Respirators	a.	Operation
		b.	Limitations/Capabilities
			1. Particulate Air Filters
			2. Chemical Cartridge Respirators
C.	Atmosphere Supplying Respirators	a.	Operation
		b.	Limitations/Capabilities
D.	Respirator Cleaning/Storage	a.	Cleaning Frequency
		b.	Maintenance
		c.	Storage

	E. Respiratory Emergencies	a.	Actions for Air Purifying Respirators
		b.	Self Contained Breathing Apparatus (SCBA) Emergency Actions 1. Buddy System 2. Regulator Failure 3. Insufficient Air Flow 4. Hyperventilation
3.	Practical Session . 2 hours	a.	Half-Facepiece, Air Purifying Regulators 1. Types 2. Mode of Operation 3. Protection Factors 4. Inspection 5. Donning 6. Qualitative Test 7. Cartridge Type 8. Removal
		b.	Full Facepiece, Air Purifying Regulator 1. Types 2. Mode of Operation 3. Protection Factor 4. Inspection 5. Donning 6. Qualitative Test 7. Removal
		c.	Full Facepiece, SCBA 1. Types 2. Mode of Operation 3. Protection Factor 4. Inspection 5. Donning 6. Qualitative Test 7. Removal

All time are approximate and do not reflect time spent on additional topics that arise due to class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: SAF-515 - Confined Space

DURATION: . 12 hours

PREREQUISITES: GET-19X/GET-20X initial training
Medical physical
SAF-630/631 Respiratory Protection
Current OPS-08 Qual Card

SCOPE: The instructor will present hazards, personal protective equipment requirements, emergency action, and compliance with regulatory and WIPP procedures involving confined space. Students will learn emergency retrieval techniques for removal of personnel from confined spaces.

Students will enter a simulated confined space using Personal Protective Equipment (PPE)

TYPE: Classroom and practical

OBJECTIVES: Upon completion of this course, the student will be able to state the requirements for entry into confined spaces, identify hazards which may exist, provide proper monitoring of the environmental conditions of spaces, and provide proper emergency response actions involving employees in distress.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination.

REFRESHER: SAF-515A Annually

COURSE: SAF-515A - Confined Space

DURATION: 4 Hours

PREREQUISITES: SAF-515 - Confined Space Initial Training
SAF-630/631 - Respiratory Protection
Current OPS-08 Qual Card

SCOPE: The instructor will present hazards, personal protective equipment requirements, emergency action, and compliance with regulatory and WIPP procedures involving confined space. The course will also review several confined space fatalities lessons learned.

TYPE: Classroom

OBJECTIVES: Upon completion of this course, the student will be able to describe the WIPP's Confined Space Program

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination

REFRESHER: Annually

COURSE: RAD-101 - Radiological Worker I

DURATION: . 16 hours

PREREQUISITES: None

SCOPE: The instructor will present radiological theory and practical information necessary to allow unescorted entry into a controlled area, radioactive materials area, radiological buffer area, and radiation area as required by the WIPP Radiation Safety Manual.

TYPE: Classroom And Practical

OBJECTIVES: Upon completion of this course, the student will have the knowledge to work safely in areas controlled for radiological purposes.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination and satisfactory performance on the practical examination.

Completion of the course meets the training requirements necessary for Radiological Worker -I (RWT-I).

REFRESHER: Retraining every two years with an alternate year refresher.

COURSE DESCRIPTION (by lesson)

1. Radiological Fundamentals
   . 2 hours
   - a. Introduction
     1. DOE Safety Policy
     2. Course Overview
     3. Radiological Worker (core academics)
        - a. Radiological Worker II (RW II) training
        - b. Course outline
        - c. Successful completion
   - b. Atomic Structure
     1. Basic Units of Matter
        - a. Protons
        - b. Neutrons
        - c. Electrons
     2. Stable and Unstable atoms
     3. Charge of the atom

- c. Definitions
    1. Ionization
    2. Ionizing radiation
    3. Non-ionizing radiation
    4. Radioactivity
    5. Radioactive material
    6. Radioactive Contamination
    7. Radioactive decay
    8. Radioactive half-life
- d. Four Basic Types of Ionizing Radiation
    1. Alpha particles
        - a. Physical characteristics
        - b. Range
        - c. Shielding
        - d. Biological hazard
        - e. Sources
    2. Beta particles
        - a. Physical characteristics
        - b. Range
        - c. Shielding
        - d. Biological hazard
        - e. Sources
    3. Gamma rays/x rays
        - a. Physical characteristics
        - b. Range
        - c. Shielding
        - d. Biological hazard
        - e. Sources
    4. Neutron particles
        - a. Physical characteristics
        - b. Range
        - c. Shielding
        - d. Biological hazard
        - e. Sources
- e. Units of Measure
    1. Radiation
        - a. Roentgen
        - b. RAD (Radiation Absorbed Dose)
        - c. Rem (Roentgen Equivalent Man)
        - d. Radiation dose and dose rate
    2. Contamination/Radioactivity
- f. 10 CFR Part 835, “Occupational Radiation Protection”

2. Biological Effects .1 hour	a. Introduction
	b. Sources of Radiation
	  1. Natural sources
	    a. Cosmic radiation
	    b. Sources in earth's crust (terrestrial)
	    c. Internal
	    d. Radon
	  2. Man-made sources
	    a. Medical radiation sources
	      1. X-rays
	      2. Diagnosis and therapy
	    b. Atmospheric testing of nuclear weapons
	    c. consumer products
	    d. Industrial uses
	c. Effects of Radiation on Cells
	  1. Biological effects
	  2. Cell sensitivity
	  3. Possible effects of radiation on cells
	    a. No damage
	    b. Cells repair damage and operate normally
	    c. Cells are damaged and operate abnormally
	    d. Cells die as a result of damage
	d. Acute and Chronic Radiation Dose
	  1. Acute radiation doses
	  2. Chronic radiation doses
	  3. Genetic effects
	  4. Factors affecting biological damage due to exposure to radiation
	    a. Total dose
	    b. Dose rate
	    c. Types of radiation
	    d. Area of the body which receives a dose
	    e. Cell sensitivity
	    f. Individual sensitivity
	e. Prenatal Radiation Exposure
	  1. Sensitivity to the unborn
	  2. Potential effects associated with prenatal exposures

f. Risks in Perspective
   1. Risk from exposures to ionizing radiation
   2. Comparison or risks
g. Summary

3. Radiation Limits
   .1 hour

a. Basis and Purposes for Radiation Dose Limits and Administrative Control levels for radiological workers
   1. Bases for DOE dose limits
   2. WIPP administrative control levels
b. Dose Limits and Administrative
   1. Whole body Control Levels
      a. Definition
      b. Limit and control levels
   2. Extremities
      a. Definition
      b. Limit and control levels
   3. Skin and other organs
      a. Definition
      b. Limit and control levels
   4. Lens of the eye
      a. Definition
      b. Limit and control levels
   5. Declared pregnant worker: Embryo/fetus
      a. DOE policy
      b. DOE limit
      c. Site policy
      d. WIPP administrative control level
   6. Visitors and public
c. Worker Responsibilities Regarding Dose Limits
d. Summary

4. ALARA Program
   .1 hour

a. ALARA Program
   1. ALARA Concept
   2. DOE Management Policy for the ALARA program
   3. Site policy
b. Responsibilities for the ALARA
   1. Management Program
   2. Radiological control organization
   3. Radiological workers

- c. External and internal radiation
    - 1. Basic protective measures used to Dose Reduction reduce external doses
        - a. Time
        - b. Distance
        - c. Shielding
    - 2. Additional methods to reduce dose
    - 3. Lessons learned
- d. Internal Radiation Dose Reduction
    - 1. Pathways
        - a. Inhalation
        - b. Ingestion
        - c. Absorption through the skin
        - d. Absorption through wounds
    - 2. Methods to reduce internal radiation dose
- e. Radioactive Waste Minimization
    - 1. Methods to minimize radioactive waste
    - 2. Separate radioactive waste from nonradioactive waste
    - 3. Separate compactable material from noncompactable material
    - 4. Minimize the amount of waste generated
    - 5. Use good housekeeping techniques
- f. Summary

5. Personnel Monitoring Programs
   . 1 hour

- a. External Dosimetry
    - 1. Thermoluminescent dosimeters
    - 2. Direct reading dosimeters
    - 3. Alarming dosimeters
    - 4. Worker responsibility for external dosimetry
- b. External Monitoring
- c. Worker Dose Records
- d. Summary

6. Radiological Postings and Controls
   . 2 hours

- a. Radiological Work Permits
    - 1. Use
    - 2. Types

a. General radiological work permit
b. Job specific radiological work permit
3. Information to be included on the permit
4. Worker responsibilities
b. Radiological postings
1. Uses
2. Requirements
3. Responsibilities of the worker associated with postings, signs, and labels
4. Consequences of disregarding radiological postings, signs, and labels
5. Requirements for entry, exit, and area working in radiologically posted areas
c. Radiological areas
1. Radiological buffer areas
a. Posting requirements
b. Minimum requirements for unescorted entry
c. Requirements for working in RBA's
d. Requirements for exit
2. Radiation areas
a. Posting requirements
b. Minimum requirements for unescorted entry
c. Requirements for working in area
d. Requirements for exit
3. Contamination areas
a. Posting requirements
b. Require special training
4. High contamination areas
a. Posting requirements
b. Require special training
5. Airborne radioactivity areas
a. Posting requirements
b. Require special training
6. Radioactive materials areas
a. Posting requirements
b. Minimum requirements for unescorted entry

	c. Requirements for working in area d. Requirements for exit 7. Fixed contamination area a. Posting requirements b. Contact radiological control for entry requirements 8. Soil contamination area a. Posting requirements b. contact radiological control for entry requirements 9. Underground radioactive materials area a. Posting requirements b. General requirements 10. Hot spots a. Posting requirements d. Summary
6. Radiological Emergencies .1 hour	a. Emergency alarms and responses 1. Area radiation monitors (ARMs) 2. Continuous Airborne Monitors (CAMs) b. Disregard for radiological alarms c. Radiological emergency situations d. Considerations in Rescue and Recovery Operations e. Summary

7. High/very High Radiation Area Training .1 hour	a. Definitions 1. High radiation area 2. Very high radiation area b. Signs and postings c. General entry, work, exit 1. Entry requirements 2. Working requirements 3. Exit requirements d. Access controls 1. Administrative controls 2. Physical controls 3. Consequences for violating radiological signs or postings or bypassing physical access controls e. Response to area radiation alarms and unusual conditions f. Considerations in Rescue and Recovery Operations g. Summary
8. Written Examination and Review .1 hour	
9. JPM Review and JPM Evaluations .4 hours	

All times are approximate and do not reflect time spent on additional topics that arise from class participation, student breaks, class size and/or practical exercises. (i.e. Job Performance Measures)

COURSE: RAD-201 - Radiological Worker II

DURATION: .8 hours

PREREQUISITES: None

SCOPE: The instructor will present an intensive course intended for the radiological workers whose job assignments involve unescorted entry to high and very high radiation areas, contamination areas, high contamination areas, and airborne activity areas.

TYPE: Classroom And Practical

OBJECTIVES: Demonstrate the ability to work safely in radiologically controlled areas, use ALARA techniques in accordance with WIPP radiation protection procedures

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination and satisfactory performance on the practical examination

REFRESHER: Retraining every two years with an alternate year refresher

COURSE DESCRIPTION (by lesson)

1. Radioactive Contamination
   .3 hours
   a. Plutonium
   b. Comparison of ionizing radiation
      1. Ionizing radiation and radioactive contamination
      2. Radioactive contamination
      3. Radiation is energy, contamination is material
   c. Types of contamination
   d. Sources of radioactive contamination
      1. Sources
      2. Indicators of possible area contamination
      3. Employee response to a spill
   e. Contamination control methods
      1. Preventable methods
      2. Engineering control methods
      3. Personal protective measures
         a. Protective clothing
   f. Contamination monitoring equipment
      1. Purpose
      2. Types and uses
      3. Frisking

- g. Decontamination
  1. Personnel decontamination
  2. Material decontamination
     - a. General considerations
     - b. Methods available
     - c. Techniques
- h. Contamination control requirements
  1. Posting requirements
  2. Requirements for entering
  3. Donning double PC's
  4. Exit requirements
  5. Method for removing items from contamination areas
- i. Unusual events involving radioactive materials
  1. Unusual events
  2. Use of the incident command system
  3. Actions of emergency responders
  4. Response techniques
- j. Identification of radiation hazards
  1. Placards
  2. Labels
  3. Shipping papers
- k. Field operation protocol for radiation accidents

2. Practical Examination and review
   . 1 hour

3. JPM Review and JPM Evaluations
   . 4 hours

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: TRG-293/298 - Subject Matter Expert and On-the-Job Training

DURATION: .4 hours

PREREQUISITES: Manager Approval

TYPE: Classroom

SCOPE: The instructor will provide the training skills and knowledge necessary to perform the role of subject matter expert (SME)/on-the-job trainer (OJT).

OBJECTIVE: Upon completion of this course the student will be able to perform the instructional duties of a Level I Instructor (SME/OJT trainer) In compliance with WIPP training policies.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination.

REFRESHER: Every Two Years

COURSE DESCRIPTION (by lesson)

1. Requirements for Qualification
   ..5 hour
   a. Qualification card
   b. Designation letter to training
   c. Training course
   d. SME Qualification Board
   e. Arranging the SME Board
   f. Conduct of the Board
   g. Maintaining qualification
   h. Lapses in qualification

2. Role of the Level I Instructor
   .1 hour
   a. Conduct formal OJT
   b. Develop/revise qualification cards
   c. Maintaining files related to area of expertise
   d. Limitations of Level I Instructors

3. On-The-Job (OJT) Training
   . 1 hour
   a. Definition
   b. Formal training vs. informal training
   c. Process for OJT
      1. Introduction phase
      2. Explanation phase
      3. Knowledge evaluation phase
      4. Demonstration phase
      5. Practice phase
      6. Practical evaluation phase
      7. Rules
   d. Trainee failures or slow learners
   e. Good OJT practices
   f. Common OJT instructor errors

4. Qualification Cards
   . 1 hour
   a. Purpose
   b. Elements
   c. Writing competency statements
   d. Selecting competency statements for requalification
   e. Reviewing qualification cards

5. Qualification Guide
   . .5

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: TRG-300 - Classroom Instructor - Level II

DURATION: . 40 hours

PREREQUISITES: Manager's approval

SCOPE: The Instructor will present the student with the information and skills necessary to develop and preform classroom instruction based on DOE guideline "Good Practice For Training And Qualification of Instructors" DOE-HDBK-1001-96.

TYPE: Classroom and Practical

OBJECTIVES: Upon completion of this course the student will be able to develop, conduct, and document formal classroom training in compliance with current WIPP training policies.

Mastery of the terminal objective will be demonstrated by satisfactory performance on all practical sessions and maintaining 80 percent or higher for an overall course Average. No score less than 70 percent may be scored on any daily examination.

REFRESHER: TRG-292 Every six months

COURSE DESCRIPTION (by lesson)

1. Introduction
   . 1 hour
   - a. Course title
   - b. Course terminal objective
     1. Part I
     2. Part II
   - c. Course topics
     1. Qualities of a competent instructor
     2. Adult learning principles
     3. PBT
     4. Training settings
     5. Learning objectives
     6. Test development
     7. Development of lesson plans
     8. Use of instructional aids
     9. Presentation and facilitation skills
     10. Effective questioning techniques
     11. Behavioral problems
     12. Demonstration method
     13. Evaluations
     14. Administration

15. Final practical examination
    a. Subject choices
    b. Time limit
    c. Requirements in the lecture
    d. Evaluation method
    e. Video taped

d. Summary

2. Competencies of a Competent Instructor .1 hour
    a. Motivator
    b. Role of the Instructor
    c. Role of the Level II Instructor
        1. Develop instructional materials
        2. Conduct formal classroom instruction in their technical area
        3. Administer examinations
        4. Document formal training
    d. Reasons for Qualified Instructors
    e. Categories of Instructor Qualities
    f. Qualities of competent instructor
    g. Common pitfalls to an instructor's success
    h. Summary

3. Adult Learning Principles .2 hours
    a. Motivator
    b. Learning defined
        1. Learning based on experience
        2. Learning as an experience retained by the learner and produces a measurable change in behavior
        3. How change can occur
        4. Categories of learning
    c. Learning style
    d. Instructor learning principles
        1. Learning principles and information processing
        2. Learning principle equals motivation
        3. Learning principle equals digestible chunks
        4. Learning principle equals experience
        5. Learning principle equals attention
        6. Learning principle equals reinforcement

7. Learning principle equals retention
8. Learning principle equals retrieval
9. Learning principle equals transfer
10. Summarize concepts

e. Adults as Learners
   1. Four adult learning principles
   2. Concept of the learner
   3. Role of experience
   4. Readiness to learn
   5. Orientation to learning
   6. Internal summary

f. Barriers to learning in adults
   1. Physical barriers
   2. Emotional barriers
   3. Intellectual barriers
   4. Learning style barriers

g. Summary

4. Overview of PBT/TAP .1 hour	a. Motivator
	b. Performance Based Training
	  1. Definition
	c. Five Phases of PBT System
	  1. Analysis
	  2. Design
	  3. Development
	  4. Implementation
	  5. Evaluation
	d. Reasons for using the PBT process
	e. Definitions of five phases
	  1. Analysis
	    a. Purpose
	    b. Process/products
	      1. Job analysis
	      2. Task analysis
	  2. Design
	    a. Purpose
	    b. Process/products
	  3. Development
	    a. Purpose
	    b. Process/products
	  4. Implementation
	    a. Purpose
	    b. Process/products
	  5. Evaluation
	    a. Purpose

			b.	Process/products
		f.	DOE Order	
			1.	DOE Order 5480.18
		h.	Summary	
5.	Methods of Instruction .1 hour	a.	Motivator	
		b.	Training sessions	
			1.	Definition
			2.	Training sessions common to DOE
			3.	Classroom setting
			4.	On-the-Job
			5.	Laboratory setting
			6.	Self-paced instruction setting
			7.	Simulator setting
		c.	Setting selection criteria	
			1.	Setting criteria
		d.	Training methods	
			1.	Lecture
			2.	Discussion
			3.	Role-play
			4.	Self-study
			5.	Walk-through
			6.	Case study
		e.	Summary	
6.	Development of Learning Objectives .1 hour	a.	Motivator	
		b.	Definition of learning objective	
			1.	Definition
			2.	Why write objectives
			3.	When to write objectives
			4.	Basic assumptions
		c.	Component parts of learning objectives	
			1.	Action statement
			2.	Conditions
			3.	Standard
			4.	Implied conditions and standards
		d.	Definition of Terminal Objective	
			1.	Definition
			2.	First sentence
			3.	Second sentence
		e.	Source of Information for Terminal Objectives	
		f.	Definition of Enabling Objective	
			1.	Definition

g. Information source for enabling objectives
h. Exercise
   1. Terminal objective
   2. Enabling objective
i. Summary

7. Methods of Testing .2 hours

a. Motivator
b. Purpose of testing
   1. Purpose of testing
   2. Selection and placement
   3. Feedback to trainers and trainees
   4. Motivation
   5. Improvement to training programs
c. When are tests developed?
   1. Analysis phase
   2. Design phase
      a. Training settings
      b. Learning objectives
      c. Entry-level skills
      d. Design
      e. Written tests
      f. Oral tests
   3. Development phase
   4. Implementation phase
   5. Evaluation phase
d. Guidelines for question development
   1. Approved test question formats at the WIPP
      a. True/false
      b. Multiple choice
      c. Matching
      d. Completion/short answer
      e. Draw/label
   2. General guidelines
   3. True/false format
   4. Multiple choice
   5. Matching
   6. Completion/short answer
   7. Draw/label
e. Approved examination format
   1. Two items per objective
   2. Meet the intent of the objective
   3. Use acceptable format
f. Examination format
   1. Version vs. multiple exam

2. Required formats
3. Approval

g. Control of examinations
    1. Examination preparation
    2. Administering the examination
    3. Grading examination

h. Examination failure

i. Summary

8. Developing Lesson Plans
   . 2 hours

a. Motivator

b. Function of a Lesson Plan
    1. Defined as TAP
    2. Accomplish objective
    3. Promote consistency
    4. Serve as guide

c. Elements of Lesson Plan format
    1. Cover page
    2. Instructor pages

d. Definition of "Introduction"
    1. Goal of introduction
    2. Preliminaries
        a. Instructor name and background
        b. Lesson title
        c. Trainee comfort
        d. Solicit participation for questions and comments
    3. Learning objectives
    4. Overview

e. Development of the Body
    1. Outline content
    2. Topics sequence
    3. Detail of content

f. Definition of Summary

g. Summary

9. Development of Instructional Aids
   . 2 hours

a. Motivator

b. Definition of instructional aid

c. Purpose of instructional aids

d. General guidelines for instructional aids
    1. Design and development guidelines
    2. Utilization guidelines

e. Guidelines for the use of visual aids

f. Writing boards (white and chalk)
    1. Introduction
    2. Development tips

3. Utilization tips

g. Flip charts
   1. Introduction
   2. Development tips
   3. Utilization tips

h. Overhead transparencies
   1. Introduction
   2. Development tips
   3. Utilization tips

i. Handout materials and study guides/workbooks
   1. Introduction
   2. Purpose
   3. Development tips
   4. Utilization tips

j. Videos/films
   1. Introduction
   2. Development tips
   3. Introduce video
   4. Utilization tips

k. Training aids
   1. Transition
   2. Types of training aids
   3. Purpose

l. Consideration for selecting training aids

m. Summary

10. Use of Presentation and Facilitation Skills . 2 hours

a. Motivator
b. Understanding speaking fears
c. Presentation skills
   1. Personal space
   2. Body movements/ gestures/eye contact/voice
   3. Exercise
d. Communications model
e. Facilitation skills
   1. Transition
   2. Attending skills
   3. Observing skills
      a. Exercise
   4. Listening skills
f. Summary

11. Effective Questioning Techniques . 2 hours

a. Motivator
   1. Why trainers do not ask questions
      a. Control

        b. Time
        c. Discomfort for self and trainees
        d. Other
    b. Advantages of questioning
    c. Characteristics of effective questions
    d. Difference between comprehension and interaction questions
    e. Types of questions
        1. Overhead question
        2. Rhetorical question
        3. Direct question
        4. Relay questions
        5. Reverse question
        6. Pointed question
        7. Offensive question
    f. Asking questions
    g. Responding to answers
    h. Summary

12. Handling Behavioral Problems
    .1 hour

    a. Motivator
    b. Characteristics of behavioral problems
        1. Argumentative
        2. Belligerent
        3. Bored
        4. Chronic questioner
        5. Clown
        6. Late to class
        7. Monopolizer
        8. Preoccupied
        9. Shy
        10. Slow learner
        11. Superior learner
        12. Exercise
    c. Guidelines for determining
        1. Determining need a personal conference
    d. Guidelines for personal conference
        1. Planning the conference
            a. State the problem
            b. Describe your reaction to the problem
            c. Ask for the trainee view of the situation
            d. Ask the trainee for recommendations
            e. Present your alternatives

- f. Select the best solution from alternatives and develop an action plan
- g. Set specific follow up review dates

2. Physical arrangement for the conference
3. Conducting the conference
4. Strategies for active listening

- e. Methods for correcting behavioral problems
- f. Summary

13. Use of Demonstration Methods
    .1 hour

- a. Motivator
- b. Purpose of the demonstration method
- c. Effective areas of demonstration method
    1. Concepts
    2. Manipulative skills
    3. Attitudes
    4. Practice
- d. Training aids
- e. Advantages and disadvantages
    1. Advantages
    2. Disadvantages
- f. Preparing for the lesson
- g. Steps in the demonstration method
    1. Introduction
    2. Presentation
    3. Practice
    4. Summary
- h. Actual presentation
- i. Exercise
- j. Summary

14. Purpose of Evaluations
    .1 hour

- a. Motivator
- b. Definition of evaluation
- c. Purposes of evaluation
- d. Sections of evaluation process
- e. Evaluations performed
    1. Trainee questionnaire
    2. Post training survey (trainee)
    3. Post training survey (supervisor)
    4. Annual instructor observation form
- f. Results of the evaluation

g. Summary

15. Training Administration
 .1 hour

a. Motivator
b. Course package
    1. Lesson plan
    2. Exam, quizzes, and JPM's
    3. Trainee handouts
    4. Overheads
    5. Approval
        a. Training records
        b. Cognizant manager
        c. Training manager
        d. Material given back to instructor
c. Course preparation
    1. Lesson plan
    2. Exams and quizzes
    3. Trainee handouts
    4. Overheads
    5. Paperwork
d. Training attendance sheet
e. Post class activities
f. Summary

16. Final Practical
 .6 hours

17. Examinations
 .2 hours

18. Work Time
 .8 hours

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: MED-101 - First Aid and CPR

DURATION: 12 hours

PREREQUISITES: None

SCOPE: The instructor will provide CPR training including one-rescuer CPR, the Heimlich maneuver, and first aid techniques.

TYPE: Classroom and CPR Practical

OBJECTIVES: Upon completion of this course, the student will be able to administer basic first aid and one-rescuer CPR in accordance with the national safety council. Identify heart disease factors, signs, and symptoms of a heart attack and perform one-rescuer CPR and the Heimlich maneuver.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination and satisfactory performance on the practical examination.

REFRESHER: MED 101A Annually

COURSE DESCRIPTION (by lesson)

1. Definitions and Legal Aspects
   .1 hour
   a. Duty to act
   b. Consent for treatment
   c. Abandonment
   d. Good Samaritan law
   e. Confidentiality

2. Assessment
   .1 hour
   a. Purpose
   b. Systematic approach considerations
   c. Parts
   d. Scene assessment
   e. Primary survey
   f. Secondary survey

3. Cardiopulmonary Resuscitation (CPR)
   .1 hour
   a. Anatomy of cardiovascular system
   b. Physiology of the heart
   c. Anatomy of the respiratory system
      1. Upper airway
      2. Lower airway
      3. Alveoli
      4. Pulmonary arteries, veins, capillaries
   d. Physiology of the respiratory system
   e. Heart disease

Treatment of Various Conditions
.4 hours

4. Shock
   a. Hypovolemic shock
   b. Fainting
   c. Anaphylactic shock

5. Bleeding
   a. Types
   b. Control
   c. Treatment
   d. AIDS and HBV

6. Head Injury
   a. General information
   b. Scalp lacerations
   c. Skull fractures
   d. Spinal injuries
      1. Treatment

7. Burns
   a. Classifications
   b. Causes
   c. Treatment

9. Heat Related Injuries/Illnesses
   a. Types
      1. Heat cramps
         a. Treatment
      2. Heat exhaustion
         a. Signs and symptoms
         b. Treatment
      3. Heat stroke
         a. Signs and symptoms
         b. Treatment

10. Bone and Joint Injuries
   a. General information
   b. Signs and symptoms
   c. Treatment

11. Summary

12. Written examination

13. Practical
   .3 hours

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: MED-101A - First Aid and CPR Refresher

DURATION: . 8 Hours

PREREQUISITES: MED-101

SCOPE: The instructor will provide refresher training Basic CPR (one-rescuer) and basic first aid techniques

TYPE: Classroom and practical

OBJECTIVES: Upon completion of this course, the student will able to administer basic first aid and one-rescuer CPR

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination and satisfactory performance on the practical examination

REFRESHER: Annually

COURSE: HMT-102 - Hazardous Materials and Waste Transportation

DURATION: . 16 Hours

PREREQUISITES: Manager approval and/or assignment to transportation duties in accordance with 49 CFR

SCOPE: Instruction meeting 49 CFR 172 Subpart H provided in a modular format. This course covers: awareness, the hazards material table, packaging, marking, labeling, placarding, material separation and segregation, special or unique transportation moves, safety, and site specific transportation issues.

TYPE: Classroom lecture including exercises to enhance trainee learning and retention

OBJECTIVES: Upon completion of the course, the trainee will be able to define, locate, apply and maintain compliance with the DOT regulations involving the transportation and/or offering for transportation of a hazardous material or waste.

Mastery of this objective will be demonstrated by scoring a minimum of 80 percent on the course examinations using "approved course" reference material.

REFRESHER: Biennially

COURSE DESCRIPTION (by lesson)

1. Awareness/familiarization
   . 1 hour
   - a. Introduction
     1. Instructor
     2. Lesson
     3. Course content
     4. Lesson objectives
   - b. Lesson materials
     1. Department of Transportation (DOT) Regulations
        - a. Brief history
        - b. Purpose
        - c. Scope
        - d. Terminology
        - e. Application of regulations
     2. Training programs
        - a. Module assignments
          1. Basic modules
          2. Additional modules
   - c. Training program objectives

	d. Training requirements
	e. General transportation responsibility
	f. General transportation liability
	g. Potential exposures
	  1. Number of shipments
	  2. Events leading to exposures
	  3. Causes for events
	h. Compliance mandate
	  1. Regulator responsibility
	  2. Penalties
	  3. Trends
	i. DOE guidance
	  1. DOE Orders
	  2. Interaction of DOE Orders and Federal Regulations
	j. Enforcement
	k. Application of DOT Regulations at DOE facility
	l. Introduction to Title 49 CFR
	  1. Overview transportation regulations
	  2. Navigating within the code book
	m. Shippers acronym
	n. Standardized DOT communications
	o. Summary
	p. Review
	q. Questions and answer

2. The Hazardous Materials Table . 3 hours	a. Introduction
	b. Lesson body
	  1. Lesson objectives
	c. Shipper's Star
	d. Definition
	  1. Hazardous material
	  2. Hazardous waste
	  3. Hazardous substance
	e. Hazard classes
	  1. 9 classes
	  2. Special cases
	  3. Class system
	  4. Identification
	  5. Shipper's responsibility
	  6. Material identification
	f. The Hazardous Materials Table
	  1. 10 columns
	  2. Navigating the hazardous materials table

g. Summary
h. Review
i. Questions and answers

3. Packaging .1.5 hours
   a. Introduction
      1. Lesson
   b. Lesson body
      1. Lesson objectives
   c. Terminology
      1. Packaging vs. package
         a. Packaging
         b. Package
   d. Identifying packaging by code
      1. Recognition types
      2. Code interpretation for UN packaging
         a. Packaging type
         b. Packaging group
   e. Limited quantity packing exemptions
      1. Describe "Limited Quantity"
      2. General criteria
   f. Package Acceptance Criteria
      1. Acceptable packaging
      2. Unacceptable packaging
   g. Summary
   h. Review
   i. Questions and answers

4. Marking .1.5 hours
   a. Introduction
   b. Lesson body
      1. Lesson objectives
      2. Purpose
      3. Material identification
         a. The PSN
         b. UN/UA number
         c. Shipments containing multiple materials
      4. Physical markings
         a. Location
         b. Marking format
         c. PIH
         d. Arrows
         e. Reportable quantities
         f. Consignor/consignee information
      5. Exemptions
   c. Summary
   d. Review

e. Questions and answers

5. Labeling . 1.5 hours

a. Introduction
b. Lesson body
    1. Lesson objective
    2. Purpose
    3. Label selection
        a. HMT table
    4. General placement of labeling
    5. Primary vs. secondary labeling
        a. Primary label
        b. Secondary
    6. Specific labeling requirements
        a. Gas cylinders
        b. Alterative labeling
    7. Mixed shipment in one package
        a. Special requirements
    8. Combination package in one
        a. Special requirements of outer package
c. Summary
d. Review
e. Questions and answers

6. Shipping Papers . 1.5 hours

a. Introduction
    1. Lesson
b. Lesson body
    1. Lesson objectives
c. Types of shipping documents
    1. Standard bill of lading
    2. Waste manifest
d. Basic components of a proper shipping paper
e. Specific shipping paper
    1. Shipper information
    2. Quantity of packages
    3. Hazardous materials
    4. Quantity of material
    5. Emergency response information
    6. Certification statement signature
f. Shipping paper format
g. Additional information
    1. Hazardous and non-hazardous shipping paper
h. Emergency information

i. Summary
j. Review
k. Questions and answers

7. Placarding
   . 1.5 hours

a. Introduction
b. Lesson material
c. Lesson objectives
d. Purpose
   1. Hazardous material identification
   2. Materials with certain exemptions
e. Application
   1. Placards should not be used
   2. Selection criteria
      a. Table application
      b. Aggregate gross weight
   3. Authorized placards
      a. Displaying requirements
      b. Placard identification
f. Shipper's requirements
g. Other placards
   1. Explosives
   2. Residue
   3. Spontaneously combustible
   4. Organic peroxide
   5. Harmful
   6. Class 9
h. Displaying of subsidiary placards
   1. Criteria
j. Displaying placards
   1. Single trailer or bobtail type truck
   2. Multiple trailers
k. Summary
l. Review
m. Questions and answers

8. Separation and Segregation
   . 1 hour

a. Introduction
b. Lesson material
   1. Lesson objectives
   2. Purpose
c. The table
   1. Layout
   2. Symbols
d. Summary
e. Review
f. Questions and answers

9. Special and Unique Moves
   .1 hour
   a. Introduction
   b. Lesson material
      1. Lesson objectives
      2. Terminology
         a. Empty
         b. Residue
   c. Treatment of "empty" shipments
   d. Overpack and salvage drums
      1. Overpack drums
         a. Intended use
         b. Use requirements
      2. Salvage drums
         a. Intended use
         b. Package requirements
   e. Shipment of samples
      1. Material identification
      2. Unknown material
   f. Summary
   g. Review
   h. Questions and answers

10. Safety
    .1 hour
    a. Introduction
    b. Lesson material
       1. Lesson objectives
       2. Emergency response information
          a. Transportation
          b. Resources
    c. Emergency Response Guide
       1. Purpose
       2. Emergency Response Guidebook layout and overview
    d. Using the emergency
       1. Locate chemical identity in Response Guidebook
       2. Review concerns and response recommendations
    e. Potential risk and actions
       1. Risk
       2. Actions
    f. Response principles
       1. "Never"
       2. Consider

g. Documentation
   1. DOT Form F5800.1
   2. When to document
h. Summary
i. Review
j. Questions and answers

11. Site Specific Transportation . 1 hour

a. Introduction
b. Lesson material
   1. Lesson objectives
   2. Department/sect/individual
      a. Employee involvement for shipment from the WIPP
      b. Material control
      c Procurement
      d. Health physics
      e. Hazardous waste operations (HWO)
c. The shipping process
d. Additional information requirements by HWO
e. Hazardous waste shipments
f. Summary
g. Review
h. Questions and answers

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: HMT-104 - DOT Emergency Response Information

DURATION: .3 hours

PREREQUISITES: None

SCOPE: This course is designed to instruct the trainee in the basic concepts of applying DOT Transportation regulations involving shipments from the WIPP site. This course will inform the trainee of information that may be required when responding to an emergency involving transportation of hazardous materials and hazardous waste from the WIPP site.

TYPE: Classroom

OBJECTIVES: Upon completion of this lesson, the trainee will be able to respond to phone request from emergency personnel when hazardous materials or hazardous waste are in transit from the WIPP site that may have been involved in a transportation accident.

Mastery of the terminal objective will be demonstrated by scoring a minimum of 80 percent on the course examination.

REFRESHER: None

COURSE DESCRIPTION (by lesson)

1. Regulations
   ..5 hour
   a. Emergency response information
   b. Applicability
   c. Availability

2. Logistics of an Emergency Response
   .2.5 hours
   a. Central Monitoring Room Operator response to a request for emergency
      1. Request received at CMR
      2. Requestor need further information
   b. Organization of Emergency Response Guidebook
      1. By placard
      2. By shipping papers
      3. By package hazardous waste label
      4. Highlighted entries
      5. No available reference Information
   c. Log entries
   d. Summary

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: SAF-501 - Inexperienced Miner Training

DURATION: 40 Hours

PREREQUISITES: None (Steel-toe shoes/boots required for underground tour)

SCOPE: The instructor will present the required information to allow unescorted underground access

OBJECTIVES: Fulfill all requirements of 30 CFR part 48 for underground access.

Mastery of the terminal objective will be demonstrated by satisfactory performance on all practical sessions and by scoring 80 percent or higher on the daily exams with no score less than 70 percent with post course examination.

REFRESHER: SAF-502 Annually

COURSE DESCRIPTION (by lesson)

1. Introduction
   . .5 hour
   - a. Paperwork
   - b. Course attendance
     - 1. Required attendance
     - 2. Special instructions
   - c. Overview of the WIPP Underground Operations
     - 1. Similarity to other mining operations
       - a. Potash mining
     - 2. Differences to other mining operations
       - a. Potash mining
       - b. Coal mining
   - d. Summary

2. Act of 1977
   . 1 hour
   - a. Creation of the Federal Mine Safety and Health Act of 1977
     - 1. Congressional Act
   - b. Purpose

		c. Coverage under the Act of 1977 1. Mandatory safety and health standards 2. Inspection rights 3. Accident investigations 4. Record keeping 5. Guidelines for correcting dangerous conditions 6. Mandatory posing of violations and warnings 7. Required training d. Summary
3.	Miner's Representative . 1 hour	a. Definition b. The miner's representative under the Act of 1977 c. The miner's representative system at WIPP d. Protection of the employee e. Need for employee participation in the inspection of the site f. Summary
4.	Reporting of Hazards/Lines of Authority . 1 hour	a. Hazards b. Reporting of hazards 1. Responsibilities a. Miner operator b. Supervisor c. Employee c. Method of reporting 1. Potential minor hazard 2. Hazards involving possible imminent dangers d. Disciplinary actions and the employee e. Need for employee involvement f. Summary
5.	Self-Rescuer/Respiratory Devices . 1.5 hour	a. Purpose b. Service life c. Inspection/Color code d. Mine operator quarterly inspection e. The self-rescuer 1. Features 2. The assembly f. Operation g. Demonstration h. Practical application

i. Respiratory protection
    1. The WIPP program
    2. Requirements
j. Summary

6. Entering and Leaving the Mine
   .1 hour

a. Access requirements
    1. Miner training
b. Qualification period
c. Lamproom location
    1. Proper safety equipment
    2. Sign-in procedure
    3. Brass tag
d. Summary

7. Transportation
   .1 hour

a. General
    1. Surface
    2. Underground
b. Hazards
c. Hazard preventive equipment
    1. Lighting
    2. Alarms
d. Personnel warning systems
e. Interaction with pedestrians
    1. Normal travel patterns
    2. Variations
f. Samples of hazards
    1. Conveyance
    2. Electric carts
    3. Haulage trucks
    4. Fork lift trucks
g. Summary

8. Communications
   .1.5 hours

a. WIPP communications systems overview
    1. Personnel
    2. Artificial
b. System breakdown
    1. Personnel communication
        a. Lamp signals
        b. Hand signals
        c. Appropriate uses
    2. Artificial communications
        a. Commercial telephone
        b. Mine phone
        c. Gia-tronics
        d. Alarms systems
        e. Alarm warning lights
c. Summary

9. Mine Map
. 1 hour
	a. Definitions
	b. Map legends
	c. Directions and locations
	  1. Underground reference point
	  2. Boundary limits
	d. Primary drifts
	  1. North/South
	  2. East/West
	e. Drifts by area name
	  1. North
	    a. East/West
	    b. North/South
	  2. Other North area drifts
	  3. South construction area
	  4. South disposal area
	f. Assembly areas
	g. Summary

10. Ventilation
. 1.5 hours
	a. Ventilation
	  1. General requirements
	b. Intake volume
	c. Intake points
	  1. Air Intake Shaft
	  2. Salt Handling Shaft
	  3. Waste Shaft
	d. Exhaust volume
	e. Primary air-flow routes
	  1. North mine area air flow (intake)
	  2. North mine area air flow (exhaust)
	  3. South mine area air flow (intake)
	  4. South mine area air flow (exhaust)
	f. Air quality
	g. Air flow balancing
	  1. The plan
	  2. Adjustments
	  3. Unapproved adjustments
	h. Escapeways
	i. Summary

11. Evacuation and Escape Routes
. 2 hours
	a. WIPP underground evacuation procedures
	  1. Authorization for evacuation
	  2. Notifications
	  3. Initial actions

- b. Escapes
  1. Purpose
  2. Primary
  3. Secondary
- c. Non-routine egress
  1. Combination usage
  2. Blocked access
- d. Define a barricade
- e. Function of barricades
- f. Permanent barricades
- g. Temporary barricades
- h. Methods of erecting a temporary barricade
- i. Barricades in relationship with WIPP design
- j. Summary

12. Ground Control . 2.5 hours

- a. Evaluation of ground control
- b. Federal regulations
- c. State mining regulations
- d. WIPP procedures
- e. Introduction to ground control and ventilation
- f. Introduction to barring down and scaling
- g. Demonstration of bar down and scaling techniques
- h. Geological formation at WIPP
- i. Review of class room instruction
- j. Field activities
  1. Identification of bad back or rib
  2. Bar down operations
  3. Scaling down operations
  4. Safety issues
- k. Summary/exam

13. Hazard Recognition . 6 hour

- a. General hazard recognition
  1. Mining as a whole
  2. Comparing WIPP with general mining industry
- b. Mobile equipment
  1. Size
  2. Construction
  3. Other hazards
- c. Ground control
  1. Over confidence in work place
  2. Barriers

      3. Improper installation of control devices
   d. Electrical hazards
      1. Cables
      2. Substations and switch racks
      3. Unauthorized personal equipment
   e. Loss of ventilation
      1. Air quality
      2. Radiation
   f. Housekeeping
      1. General
      2. Risk to personnel
   g. Laser operations
   h. Seismic activity
   i. Summary

14. Health
    .1 hour
   a. Air quality
      1. Dust
      2. Other vapors
      3. Personal protective equipment
   b. Noise
      1. Acceptable working levels
         a. 8 hour shift
         b. Short term
      2. Protection against damage
         a. In-ear protection
         b. Over-the-ear protection
   c. Chemicals
      1. Use
      2. Personal protective equipment
      3. Training
      4. Health effects
      5. Pre-event planning
   d. Potable water
   e. Toilet facilities
      1. Chemical toilets
   f. Waste receptacles
      1. General
   g. Food consumption
      1. Restriction
   h. Radiation exposure
      1. ALARA
      2. External
      3. Internal
      4. Through wounds
   i. Summary

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: SAF-502 - Mine Safety-Experienced Miner Refresher

DURATION: .8 Hours

PREREQUISITES: SAF-501

SCOPE: The instructor will update personnel of any change or modification in the underground

TYPE: Classroom

OBJECTIVES: Fulfill requirements of 30 CFR part 48, for annual experienced miner refresher training

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination

REFRESHER: Annually

COURSE DESCRIPTION (by lesson)

1. Introduction
   .5 hour
   a. Hand out 5000-23 MSHA Forms
   b. Workplace overview
      1. Ground control
      2. Electrical
      3. Air quality
      4. Equipment
         a. Accidents
         b. Fires
         c. Noise
   c. Summary

2. Authority and Responsibility of Supervisors, Miner's Representatives
   .5 hour
   a. Miner's representative
   b. Miner's rights and responsibilities
   c. Normal reporting of safety issues
   d. Safety issues with eminent danger
      1. Verbal notification
      2. Protection from reporting safety issues
      3. Work refusal
   e. Summary

3. Ventilation
   .1 hour
   a. Intake volume
   b. Intake points
      1. Air Intake Shaft
      2. Salt Handling Shaft
      3. Waste Shaft
   c. Exhaust volume

	1. Exhaust Shaft 2. EFB capabilities
	d. Primary air-flow routes 1. North mine area air flow (intake) 2. North mine area air flow (exhaust) 3. South construction air flow (intake) 4. South construction air flow (exhaust) 5. South disposal area air flow (intake) 6. Waste Shaft station area
	e. Air quality 1. Required testing 2. Ventilation failure 3. Adjustments 4. Unapproved adjustments
	f. Summary
4. Ground Control .1 hour	a. Ground control 1. General employee responsibility 2. Typical ground failures 3. Ground control practices b. Summary
5. Entering and Leaving the Mine Transportation and Controls ..5 hour	a. Underground access procedure 1. General employee responsibility 2. Violation of restricted areas b. Personal protective equipment c. Transportation 1. The conveyance 2. Mobile equipment 3. Airlocks and doors d. Summary
6. Communication, Warning Alarms and signals ..5 hour	a. Communication systems 1. GTE telephone 2. Mine telephone 3. Public address system b. Alarm systems 1. Fire c. Emergency staging areas 1. Assembly areas 2. Station areas

	d. Alarm notification actions 1. Escapeways 2. Retreat to station for evacuation 3. Retreat to assembly areas e. Summary
7. Mine Map, Escapeway, Emergency Evacuation and Barricades . 1 hour	a. Escapeways b. Assembly areas 1. Purpose 2. Locations 3. Personnel duties during emergencies c. Barricade equipment d. Summary
8. Accident Prevention . .5 hour	a. Event happenings b. Changing events c. Pre-event recognition d. Lessons learned e. Summary
9. Self-Rescuer . .5 hour	a. Definition b. Purpose c. Inspections d. Methods of conversion - catalytic conversion e. Protection from deadly gas f. Conversion to what compound? g. Effect time limit h. Compounds and operation i. Practical applications j. Summary
10. First Aid . 1 hour	a. Basic principles

All times are approximate and do not reflect additional time spent on topics that arise from class participation. student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: RIG-001 - Incidental Rigger

DURATION: .16 Hours

PREREQUISITES: None

SCOPE: The instructor will present types of rigging, how to size up the load to be lifted, and the mechanical lifting devices.

TYPE: Classroom

OBJECTIVES: Upon completion of this course, the student will be able to perform incidental rigger duties in compliance with the DOE Standard Hoisting and Rigging Manual DOE-STD-1090-96.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination.

REFRESHER: None

COURSE DESCRIPTION (by lesson)

1. Identifying Rigging Components
   .4 hours
   - a. Qualifications
   - b. Definitions
   - c. Wire rope components
     1. Core
     2. Strand
     3. Wire
   - d. Core
     1. Strand
     2. Wire
     3. Lay of the rope
     4. Length of the rope lay
     5. Inspection
   - e. Web slings
   - f. Polyester slings
   - g. Wire rope slings
     1. Inspection
     2. Hooks
     3. Spreader beam
     4. Eyebolts
     5. Shackles - anchor and chain
     6. Wire rope clips - U bolt and twin base
     7. Turnbuckles

2.	Inspection and Storage - Weight Calculation .4 hours	a.	Rigging inspection 1. Improper sling use 2. Inspection techniques 3. Rigging storage 4. Load weight determination 5. Calculations 6. Center of gravity 7. Slings and hitches 8. Load angle 9. Choker hitch rated capacity adjustment 10. Load cell
3.	Identity Lifts/Long Term Check-Out Hand Signals .4 hours	a.	Load indicating devices 1. Ordinary lift
		b.	Critical lifts 1. Determination 2. Requirements
		c.	Pre-engineered production lift
		d.	Rigging check-out
		e.	Long-term checkout
		f.	Standard signals and signaler identification
4.	Identify rigging Attachments, Accessories and Uses .4 hours	a.	Beam Clamps 1. Types 2. Inspection 3. Hand operated hoists a. Chain hoist b. Lever operated hoist 1. Link chain 2. Roller chain 3. Wire rope
		b.	Jacks
		c.	Using jacks
		d.	Cribbing
		e.	Cribbing assembly

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: OPS-115 - Conduct of Shift Operations

DURATION: .8 hours

PREREQUISITES: None

SCOPE: The instructor will describe how shift operation will be conducted at the site.

OBJECTIVES: Upon completion of this course, the student will be able to perform their job in accordance with Operations Department "Conduct of Operations" WP 04-CO.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination.

REFRESHER: NONE

COURSE DESCRIPTION (by lesson)

1. DOE Guidance for Conduct of Operations and Basic Requirements .1 hour
   - a. DOE Policy
   - b. DOE Orders
   - c. Conduct of operations sections
     1. Operations organization and administration
     2. Shift routines and operating practices
     3. Control area activities for the WIPP
     4. Communications
     5. Control of on-shift training
     6. Investigation of abnormal events
     7. Notifications
     8. Control of equipment and system status
     9. Tagouts and lockouts
     10. Independent verification
     11. Logkeeping
     12. Operations turnover
     13. Operations aspects of facility unique processes
     14. Required reading
     15. Timely orders to operators
     16. Operations procedures
     17. Operator aid posting
     18. Equipment and piping labeling

- d. Operations organization and administration
  1. Operations Policies
  2. Resources
  3. Monitoring of operating performance
  4. Accountability
  5. Planning for safety
- e. Procedures
  1. Use of procedures
  2. Working copies

2. Sections of Conduct of Operations .5 hours

A. Communications	a. Emergency communications b. Public address system usage c. Contacting operators d. Radios e. Abbreviations and acronyms f. Oral instructions and informational communications
B. Control Area Activities	a. Control area access b. Professional behavior c. Monitoring the main control panels d. Control operator ancillary duties e. Operation of control area equipment
C. Control of Equipment and System Status	a. Status change authorization and reporting b. Equipment and systems alignment c. Equipment locking and tagging d. Equipment deficiency identification and documentation e. Work authorization and documentation f. Equipment post-maintenance testing and return to service g. Alarm status h. Temporary modification control i. Distribution and control of equipment and system documents
D. Independent Verification	a. Components requiring independent verification b. Occasions requiring independent verification c. Verification techniques

E. Operator Aid Postings

F. Equipment and Piping Labeling
  a. Requirements
  b. Identifying labeling deficiencies

G. Shift Requirements
  a. Routines and operating practices
    1. Status practices
    2. Safety practices
    3. Operator inspection tours
    4. Round/tour inspection sheets
    5. Personnel protection
    6. Response to indications
    7. Resetting protective devices
    8. Load changes
    9. Authority to operate equipment
    10. Shift operating bases

H. Control of On-Shift Training
  a. Adherence to training programs
  b. On-shift instructor qualification
  c. Supervision and control of trainees
  d. Operator qualification program approval
  e. Training documentation
  f. Suspension of training
  g. Maximum number of trainees

I. Logkeeping
  a. Establishment of operating logs
  b. Timeliness of recordings
  c. Information to be recorded
  d. Legibility
  e. Corrections
  f. Log review
  g. Care and keeping of logbooks

J. Operations Turnover
  a. Turnover checklists
  b. Document review
  c. Control panel walk-down
  d. Discussion and exchange of responsibility
  e. Shift crew briefing
  f. Reliefs occurring during the shift

K. Operations Aspects of Facility Unique Processes
  a. Operator responsibilities
  b. Operator knowledge
  c. Operator response to process problems
  d. Communications between operations and process personnel

L.	Required Reading	a.	File Index
		b.	Reading assignments
		c.	Required dates for completion of reading
		d.	Documentation
		e.	Review
M.	Timely Orders to Operators	a.	Content and format
		b.	Issuing, segregating, and reviewing orders
		c.	Removal of orders

3. Summary

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: TRG-296 - Root Cause Analysis

DURATION: .8 hours

PREREQUISITES: None

SCOPE: The instructor will provide personnel with the knowledge and skills necessary to identify the root cause of unplanned plant events, in accordance with DOE standards. Students will analyze incidents to identify corrective action necessary to prevent the incidents from recurring. This training is recommended for all operators, technicians, supervisors, and managers.

TYPE: Classroom And Practical

OBJECTIVES: Upon completion of this course, the student will be able to perform root cause analysis in accordance with DOE Order 232.1.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination and satisfactory performance on the practical examination.

REFRESHER: None

COURSE DESCRIPTION (by lesson)

1. Introduction to Root Cause Analysis
   .2 hours
   - a. Case study
   - b. Root cause
   - c. Other causes
   - d. Event
   - e. Event/cause relationship
   - f. Root cause analysis
   - g. Reason for root cause analysis
     1. Overview
     2. Specifics
     3. Concern - employees
     4. Concern - facility
     5. Concern - company permanent image
     6. Concern - public and environment
     7. Concern - economic
     8. Concern - legal

2. Root Cause Analysis Process
   . 4 hours
   a. Phases and sub-phases
      1. Collect data
      2. Correct
      3. Inform
      4. Follow-up
   b. Phase one - collect data
      1. What to collect
      2. How to collect
      3. Data review
   c. Phase two - assess
      1. Purpose
      2. Methods
      3. Use, advantages, and disadvantages
      4. Event and casual factor charting
      5. Consists of two phases
      6. Cause and effect
      7. Cause and effect charting
   d. Phase three - correct
   e. Phase four - communications
      1. Internal
      2. External
   f. Phase five - follow-up

3. Root Cause Analysis at the WIPP
   . 1 hour
   a. Investigations
   b. Reportable and non-reportable events
   c. Root cause analysis team report
   d. Reportable events
   e. Non-reportable events
   f. Follow-up

4. Summary
   . 1 hour

5. Homework

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

COURSE: SAF-645 - RCRA Emergency Coordinator (WIPP Contingency Plan Procedure)

DURATION: N/A

PREREQUISITES: None

SCOPE: This self-paced lesson describes the responsibilities and actions to be taken by the RCRA Emergency coordinator and other emergency response personnel whenever the WIPP Contingency Plan is implemented.

TYPE: Self-paced

OBJECTIVES: Upon completion of this course, the student will be able to perform the duties of RCRA Emergency Coordinator in accordance with established requirements.

Mastery of the terminal objective will be demonstrated by scoring 80 percent or higher on the course examination.

REFRESHER: None

1. State the purpose of the RCRA Contingency Plan.
2. Describe the general responsibilities of the RCRA Emergency Coordinator.
3. Identify the emergency response groups and their responsibilities.
4. State when the Contingency Plan is to be implemented.
5. Describe the criteria for Incident Levels I, II, and III.
6. Describe the types of events that do not implement the Contingency Plan.
7. Describe the activities regarding initial response and notification of emergency response personnel.
8. Describe the actions to be taken when a surface evacuation is declared.
9. Describe the action to be taken when an underground evacuation is declared.
10. State the information that is included in notifications to public safety and regulatory safety agencies.

11. Describe the various means of identifying hazardous materials.

12. Describe the information that is initially provided to the Emergency Coordinator by the EST.

13. Describe the additional information that is collected to conduct a more thorough assessment.

14. Define the 4 criteria that are evacuated in the assessment stage of an incident.

15. State when the RCRA Emergency Coordinator would request assistance from off-site agencies.

16. Describe the actions involved in the control, containment, and correction of an incident.

17. Describe physical and chemical methods of mitigation.

18. Describe the actions that are implemented in the event of a fire.

19. Describe the actions to be taken in the event of an explosion.

20. Describe the actions to be taken in the event of a spill.

21. Describe the actions to be taken in the event of container spills or leakage.

22. State who is responsible for the radiological decontamination of personnel.

23. Describe the response actions to spills, or leaking, or punctured CH and RH TRU mixed waste containers.

24. Describe the actions to be taken in the event of a natural emergency (earthquake, lightning strike, etc.) involving hazardous waste or materials.

25. Describe the response efforts in the event of spalling of ground in the underground.

26. Describe the response efforts in the event of a roof fall in the underground.

27. Describe the events to be completed during the emergency termination phase.

28. Describe the reporting requirements in the event the Contingency Plan is implemented.

COURSE: SAF-632 - Office Warden

DURATION: . 2 Hours

PREREQUISITES: None

SCOPE:

TYPE: Classroom

OBJECTIVES: Upon completion of this course, the student will be able to state the responsibilities and duties of the Office Warden, in accordance with established guidelines, policies, and regulations.

REFRESHER: SAF-632 annually

1. Objectives . 10 minutes	a. Define role of Office Warden b. List responsibilities c. Describe emergency notification system d. Describe purpose of assembly/staging areas
2. Presentation . 90 minutes	a. Role of Office Warden b. Office Warden responsibilities 1. Day-to-day 2. Emergency situations 3. Bomb threats 4. Inclement weather 5. Personnel accountability w/no assembly c. Emergency Notification System 1. Different evacuation notifications 2. Reporting emergencies d. Assembly/staging areas 1. Purpose 2. Locations
3. Review and Exam . 20 minutes	

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises (i.e. Job Performance Measures)

COURSE: SAF-621 - Firefighter I

DURATION: . 40 hours

PREREQUISITES: None

SCOPE: This class prepares the student to respond to fires. This class is taught by the New Mexico Fire Academy

OBJECTIVES:

REFRESHER: Training is conducted 8 hours quarterly

COURSE DESCRIPTION (by lesson)

1. Inspection
   . .5 hour classroom
   a. Common causes of fires and their prevention
   b. Fire protection procedures
   c. Define importance of public relations
   d. Define dwelling inspection procedures

2. Sprinklers
   . .5 hour classroom
   a. Identify a fire department sprinkler connection and water motor alarm
   b. Connect hose lines to a fire department connection of a sprinkler or standpipe system
   c. Define how automatic sprinkler heads open and release water
   d. Temporarily stop flow of water from a sprinkler head

3. Overhaul
   . 2 hours classroom
   a. Demonstrate searching for hidden fires
   b. Demonstrate exposure of hidden fires by opening ceilings, walls, floors, and pulling apart burned material
   c. Demonstrate how to separate and remove charred materials from unburned material
   d. Define duties of fire fighters left at the scene for fire and security surveillance
   e. Identify the purpose of overhaul

4. Salvage
   . 1.5 hours classroom
   . .5 hours practical

   a. Identify the purpose of salvage and its value
   b. Demonstrate folds and rolls of salvage covers
   c. Demonstrate salvage cover throws
   d. Demonstrate the techniques of inspection, cleaning, and maintaining salvage equipment

5. Fire Streams
   . 1.5 hours classroom
   . 2.5 hours practical

   a. Define a fire stream
   b. Manipulate a nozzle so as to attack Class A and Class B fires
   c. Define water hammer and at least one method for its prevention
   d. Demonstrate how to open and close a nozzle

6. Fire Hoses, Nozzles, and Appliances
   . 2.5 hours classroom
   . 3.5 hours practical

   a. Identify the sizes, types, amounts, and uses of hose carried on a pumper
   b. Demonstrate the use of nozzles, hose adapters, and hose appliances carried on a pumper
   c. Advance dry hose lines of two different sizes from a pumper:
      1. Into a structure
      2. Up a ladder into an upper floor window
      3. Up an inside stairway to an upper floor
      4. Up an outside stairway to an upper floor
      5. Down an inside stairway to a lower floor
      6. Down an outside stairway to a lower floor
      7. To an upper floor by hoisting
   d. Advance charged hose lines of two different sizes from a pumper
      1. Into a structure
      2. Up a ladder into an upper floor window
      3. Up an inside stairway to an upper floor
      4. Up an outside stairway to an upper floor
      5. Down an inside stairway to a lower floor

6. Down an outside stairway to a lower floor
7. To an upper floor by hoisting

e. Demonstrate the techniques for cleaning fire hose, couplings, and nozzles and inspecting for damage
f. Connect a fire hose to a hydrant and fully open and close the hydrant
g. Demonstrate the loading of fire hose on a fire apparatus and identify the purpose of at least three types of hose loads and finishes
h. Demonstrate three types of hose rolls
i. Demonstrate two types of hose carries
j. Demonstrate coupling and uncoupling of the fire hose
k. Work from a ladder with a charged attack line which shall be 1.5" or larger
l. Demonstrate carrying hose into a building to be connected to a standpipe
m. Demonstrate the methods for extending a hose line
n. Demonstrate replacing a burst section of hose line

7. Forcible Entry . 3 hours classroom . 1 hour practical	a. Identify and demonstrate each type of manual forcible entry tool b. Identify the method and procedure of properly cleaning, maintaining, and inspecting each type of forcible entry tool and equipment
8. Ladders . 1.5 hours classroom . 2.5 hours practical	a. Identify each type of ladder and its intended use b. Demonstrate the following ladder carries: 1. One person carry 2. Two person carry 3. Three person carry 4. Four person carry 5. Five person carry 6. Six person carry

c. Raise each type and size of ground ladder
d. Climb the full length of every type
e. Climb the full length of each type of ground and aerial ladder carrying fire fighting tools or equipment while ascending and descending
f. Climb down the full length of a ground and aerial ladder carrying an injured person
g. Demonstrate the techniques of working from ground and aerial ladders with tools and appliances
h. Demonstrate the techniques of cleaning ladders

9. Rescue
 .5 hour classroom
 .1.25 hours practical

a. Demonstrate the removal of injured persons from immediate hazards practical by use of carries, drags, and stretchers
b. Demonstrate searching for victims in burning, smokefilled buildings, or other hostile environments
c. Define the use of a life belt
d. Define safety procedures as they apply to rescue

10. Self-Contained Breathing Apparatus
 .2 hours classroom
 .2 hours practical

a. Identify at least four hazardous respiratory environments encountered in fire fighting
b. Demonstrate the use of all types of self-contained breathing apparatus in a dense smoke environment
c. Identify the physical requirements of the wearer, the limitations of the self-contained breathing apparatus, and the safety features of all types of self-contained breathing apparatus
d. Demonstrate donning self-contained breathing apparatus while wearing protective clothing
e. Demonstrate that the self-contained breathing apparatus is in a safe condition for safe use
f. Identify the procedure for cleaning and sanitizing the self-contained breathing apparatus for future use

11.	Ropes .2 hours class room and practical	a.	Identify and describe the purpose for specific knots
		b.	Identify the construction characteristics and appropriate uses of natural and synthetic fiber rope
		c.	Demonstrate tying a bowline knot, a clove hitch, rescue knot, figure of eight knot, a becket or sheep bend, and an overhand safety knot
		d.	Demonstrate the bight, loop, round turn, and half hitch as used in tying knots and hitches
		e.	Using an overhand knot, hoist any selected forcible entry tool, ground ladder, or appliance to a height of 20 feet
		f.	Demonstrate the techniques of inspecting, cleaning, maintaining, and storing rope
12.	Ventilation .5 hours classroom	a.	Define the principals of ventilation, and identify the advantages and effects of ventilation
		b.	Identify the dangers present and precautions to be taken when performing ventilation
		c.	Demonstrate opening various types of windows from inside and outside, with and without tools
		d.	Demonstrate breaking window and door glass and its removal
		e.	Using an ax, demonstrate the ventilation of a room and a floor
		f.	Define the theory of a back draft explosion
13.	Safety .1 hour classroom	a.	Identify dangerous building conditions created by fire
		b.	Demonstrate techniques for action when trapped or disoriented in a fire situation
		c.	Define procedures to be used in electrical emergencies
		d.	Define fire service lighting equipment

e. Identify safety procedures when using fire services lighting equipment
f. Demonstrate the use of portable power plants, lights, cords, and connectors
g. Define safety procedures as they apply to emergency operations, specifically:
   1. Protective equipment
   2. Team concept
   3. Portable tools and equipment
   4. Riding and apparatus
   5. Hazardous materials incidents

14. Fire Behavior
.3 hours

a. Define fire
b. Define the fire triangle and fire tetrahedron
c. Identify two chemical, mechanical, and electrical energy sources
d. Define the following stages of fire:
   1. Incipient
   2. Flame spread
   3. Hot smoldering
   4. Flash over
   5. Steady state
   6. Clear burning
e. Define the three methods of heat transfer
f. Define the three physical stages of matter in which fuels are commonly found
g. Define the hazard of finely divided fuels as they relate to the combustion process
h. Define flash point, fire point, and ignition temperature
i. Define concentrations in air as it affects combustion
j. Identify three products of combustion found in structural fires which create a life hazard

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises (i.e., Job Performance Measures)

COURSE: EOC-101 - Initial Mine Rescue

DURATION: 20 Hours

PREREQUISITES: Physical, underground experience

SCOPE:

TYPE: Classroom, field, hands-on

OBJECTIVES: Upon completion of this training, the student will be able to wear and maintain a Drager self-contained breathing apparatus, and perform all the functions required as a member of a mine rescue team.

REFRESHER: 48 hours of refresher training is required annually

COURSE DESCRIPTION (by lesson)

1. MSHA 2004 (Drager BG 174-A)
   . 8 hours
   a. Description
   b. Major parts
   c. Wearing and testing
   d. Limitations
   e. Maintenance

2. MSHA 2202 (Mine Gases)
   . 2 hours
   a. Meaning of terms
      1. Specific gravity
      2. Explosive range
      3. Toxicity
      4. Asphyxiate
      5. Solubility
   b. Physical properties and characteristics
      1. Normal air
      2. Oxygen
      3. Nitrogen
      4. Carbon dioxide
      5. Carbon monoxide
      6. Oxides of nitrogen
      7. Hydrogen
      8. Hydrogen sulfide
      9. Sulfur dioxide
      10. Methane
   c. Composition, physical properties, and characteristics
      1. Smoke
      2. Rock strata gases
      3. Damps

3.	MSHA 2203 (Mine Ventilation) .2 hours	a.	Purpose and methods
		b.	Ventilation controls
		c.	Proper chain-of-command when altering ventilation
		d.	Air measurement devices
		e.	Construction of ventilation controls
4.	MSHA 2204 (Mine Exploration) .2 hours	a.	Examination of mine openings
		b.	Barefaced exploration
		c.	The fresh air base
		d.	Apparatus teams
		e.	Briefing
		f.	Going underground
		g.	Exploration procedures
		h.	Traveling procedures
		i.	Ground testing
		j.	Debriefing
5.	MSHA 2205 (Firefighting) .2 hours	a.	Classification of fires
		b.	Firefighting equipment
		c.	Firefighting techniques 1. Indirect 2. Direct
		d.	Explosions
6.	MSHA 2206 (Rescue of Survivors) .2 hours	a.	Rescuing survivors 1. Rescue techniques 2. First aid
		b.	Recovery of bodies
7.	MSHA 2207 (Mine Recovery) .2 hours	a.	Assessing conditions
		b.	Reestablishing ventilation
		c.	Clearing and rehabilitating

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size and/or practical exercises (i.e., Job Performance Measures)

COURSE: Radiological Control Technician Fundamental Academic Lessons

DURATION: - 52 hours
Students may elect to test out of these courses with Radiological Control Manager approval

PREREQUISITES: Lesson specific

SCOPE: Lesson specific

REFRESHER: Requalification every two years

COURSE DESCRIPTION (by module)

1. Basic Mathematics and Algebra (CL1.01) . 4 hours

a. Prerequisites - None
b. Scope - This lesson is a review of arithmetic and algebraic methods used to perform various radiological control calculations required by the RCT to perform his/her daily duties. These calculations include scientific notation, unit analysis and conversion, radioactive decay calculations, dose rate/distance calculations, shielding calculations, and stay-time calculations.
c. Outline - Introduction
- Basic math operations with fractions
- Basic math operations with decimals
- Convert fractions to decimals and vice-versa
- Convert percent to decimal and vice-versa
- Basic math operations with signed numbers
- Basic math operations with exponents
- Find rational square roots
- Convert scientific notation to standard form and vice-versa
- Basic math with scientific notation
- Solving equations using the "Order of Mathematical Operations"
- Performing algebraic functions
- Solving equations with common and natural logarithms
- Exam

2. Unit Analysis and Conversion (CL1.02) . 4 hours

a. Prerequisites - None
b. Scope - This lesson is a review of the unit analysis and conversion process necessary for the RCT to perform air and water sample activity calculations, contamination calculations, and many other applications.
c. Outline - Introduction
- Unit systems of measurement and base units for mass, length and time
- SI prefix values and abbreviations
- Using conversion factors/tables
- Using formulas
- Exam

3. Physical Sciences (CL1.03) . 4 hours

a. Prerequisites - None
b. Scope - This lesson is a review of basic physics since the RCT may work in environments where materials can undergo changes in state, resulting in changes in the radiological work environment.
c. Outline - Introduction -
- Work/force/energy in relation to physics
- Identify and describe four forms of energy
- State the Law of Conservation of Energy
- Solid/liquid/gas in regards to shape and volume
- Basic atom structure
- Defining physical science terms
- Identifying symbols
- Periodic Table element arrangement
- Identifying Periodic Table layout
- Defining terms relative to atomic structure
- Exam

4. Nuclear Physics (CL1.04) . 4 hours

a. Prerequisites - None
b. Scope - This lesson is designed to provide an understanding of the forces present within an atom.
c. Outline - Introduction
- Definitions: Nucleon, Nuclide, Isotope
- Mass-Energy Equivalence Concept
- Definitions: Mass Defect, Binding Energy
- Definitions: Fission, Criticality, Fusion
- Exam

5. Sources of Radiation (CL1.05) . 4 hours

a. Prerequisites - None

b. Scope - This lesson provides an understanding that radiation sources are not limited to nuclear facilities. The study of radiation sources provides data for:
- The basis for occupational exposure
- Showing the effects from high source exposures
- Assessing the impact on radiation background from nuclear facilities
- Determining the use of building materials

c. Outline - Introduction
- Identifying natural background radiation sources
- Identifying artificially produced radiation sources and dose magnitudes from each source
- Exam

6. Radioactivity and Radioactive Decay (CL1.06) . 4 hours

a. Prerequisites - None

b. Scope - This lesson provides an understanding of the radioactive decay processes from different types of radionuclides.

c. Outline - Introduction
- Neutron to proton ratio
- Definitions: radioactivity, radioactive decay
- Characteristics of alpha, beta, and gamma
- Identifying radioactive decay modes
- Decay of radioactive nuclides
- Differences: natural and artificial radioactivity
- Unstable fission products
- Three naturally-occurring radioactive families and their end products
- Identify nuclide attributes with Nuclide Chart
- Tracing nuclide decay and stable end-product
- Definitions: curie, Becquerel
- Definitions: specific activity, half-life
- Calculate activity using the decay formula
- Defining exposure, absorbed dose, dose equivalent, and quality factor
- Defining roentgen, rad/gray, and rem/sievert
- Exam

7. Interaction of Radiation with Matter (CL1.07) . 4 hours

a. Prerequisites - None

b. Scope - This lesson provides an understanding of how different types of radiation interacts with different types of matter.

c. Outline - Introduction
- Define ionization, excitation, bremsstrahlung
- Defining specific ionization, linear energy transfer (LET), stopping power, range, and W-value
- Alpha particle energy transfer
- Energy transfer for beta particulate radiation
- Gamma photon interaction with matter
- Kinetic energies of various types of neutrons

- Slow neutron capture
- Scattering interactions for fast neutrons
- Characteristics of materials shielding alpha, beta, gamma and neutron radiations
- Exam

8. Biological Effects of Radiation (CL-1.08) . 4 hours

a. Prerequisites - None
b. Scope -This lesson provides a basic understanding of the methods in which radiation may cause biological damage so that the RCT may protect themselves and the workers from unnecessary exposure to ionizing radiation.
c. Outline - Introduction
   - Function of various cell structures
   - Effects of radiation on cell structures
   - Law of Bergonie and Tribondeau
   - Factors affecting radiosensitivity of cells
   - Most and least radiosensitive cells
   - Reactions on cells from ionizing radiation
   - Definitions: stochastic, non-stochastic effect
   - LD 50/30 value for humans
   - Somatic effects of chronic radiation exposure
   - Three types of acute radiation syndromes and associated exposure levels and symptoms
   - Radiation exposure risks to embryo and fetus
   - Somatic and heritable effects
   - Exam

9. Radiological Protection Standards (CL1.09) . 4 hours

a. Prerequisites - None
b. Scope -This lesson provides an understanding of the history of the development of the limits to show why the current limits of exposure are imposed. This lesson also provides an awareness of the current CFRs and DOE Orders that may affect the RCTs at the work place.
c. Outline - Introduction
   - Role of advisory agencies in developing radcon recommendations
   - Role of regulatory agencies in developing standards and regulations
   - DOE RCM purpose and scope
   - DOE RCM use of “shall” and “should”
   - Exam

10. ALARA (CL1.10) . 4 hours

a. Prerequisites - None
b. Scope - This lesson provides an understanding of the ALARA philosophy and shows the methods for the RCT to establish and maintain the commitment to

ALARA that all personnel at the facility must have for a safe radiological work place.

c. Outline - Introduction
- Base assumptions for ALARA philosophy
- Collective personnel and individual exposure
- Effective radiological ALARA program
- Purposes of pre- and post-job reviews
- RCT responsibilities for implementation
- Exam

11. External Exposure Control (CL1.11) . 4 hours

a. Prerequisites - None

b. Scope -This lesson provides an understanding of external exposure reduction and control measures available to the RCT to provide the best coverage and support at the radiological work site.

c. Outline - Introduction
- Four basic methods for minimization
- Calculating gamma exposure rates
- Source reduction techniques
- Time-saving techniques
- Calculating remaining allowable dose equivalent or stay time
- “Distance to radiation sources” techniques
- Calculating exposure rate or distance for a point source of radiation
- Calculating exposure rate or distance for a line source of radiation
- Effects of distance on exposure rates from a plane source
- Mass and linear attenuation coefficients
- Defining “density thickness”
- Density-thickness values for skin, lens of the eye, and the whole body
- Using equations to calculate shielding thickness and exposure rates for gamma/x-ray radiation
- Exam

12. Internal Exposure Control (CL1.12) . 4 hours

a. Prerequisites - None

b. Scope - This lesson is designed to familiarize the technician with those actions necessary as a result of the entry of radioactive materials into the body and the basis for those actions.

c. Outline - Introduction
- Four ways radioactive material enters the body
- Methods to prevent/minimize entry of radioactive material
- Defining and distinguishing ALI and DAC
- Determining basis for ALI
- Defining “reference man”
- Using DACs to minimize internal exposure
- Behavior of radioactive materials in the body
- Natural reductions of radionuclides in body

- Relationship between physical, biological and effective half lives
- Calculating effective half life
- Medical elimination methods
- Exam

13. Radiation Detector Theory (CL1.13) . 4 hours

a. Prerequisites - None
b. Scope - This lesson provides a good theoretical understanding of radiological instrumentation to help RCTs understand the data obtained by that instrumentation.
c. Outline - Introduction
   - Fundamental laws of electrical charges
   - Defining current, voltage, resistance, and their respective units
   - Functions of detector and readout circuitry components in radiation measurement system
   - Parameters affecting ion pair numbers in a gas-filled detector
   - Regions of gas amplification curves
   - Characteristics of a detector used in gas amplification curve regions
   - Defining resolving time, dead time, and recovery time
   - Discriminating between various types of radiation and various radiation energies
   - Operation of scintillation detector and associated components
   - Operation of neutron detector
   - Principles of GeLi and HPGe detectors
   - Exam

COURSE: Radiological Control Technician Site-Specific Academic Lessons

DURATION: . 88 hours

PREREQUISITES: Lesson specific

SCOPE: Lesson specific

1. Counting Errors and Statistics (CL2.03) . 4 hours

a. Prerequisites - CL1.01 through CL1.13
b. Scope - This lesson provides a basic knowledge of the random process of detecting and measuring radioactivity and the associated counting errors involved with that process. The RCTs will use this knowledge when obtaining the radioactivity measurements to make decisions that may affect the health and safety of workers at the facility and its surrounding environments
c. Outline - Introduction
  - Analyzing errors and their effect on sample measurements
  - Sample analysis statistics applications
  - Defining mean, median, and mode
  - Determining mean, median, and mode
  - Defining variance and standard deviation
  - Calculating the standard deviation
  - Purpose of Chi-squared test
  - Criteria for acceptable Chi-squared values at the WIPP
  - Purpose of creating quality control charts
  - WIPP QC chart maintenance and review requirements
  - Purpose of warning and control limits
  - Purpose of efficiencies and correction factors
  - Calculating efficiencies and correction factors
  - Meaning of counting data reported as "x±y"
  - Reporting results to desired confidence level
  - Purpose of determining background
  - WIPP methods and requirements for determining background
  - Purpose of performing sample planchet maintenance
  - WIPP method and requirements of performing planchet maintenance for counting systems
  - Methods to improve statistical validity of sample measurements
  - Defining and explaining "detection limits"
  - Calculate detection limit values at WIPP
  - Purpose, method, and criteria for acceptable values of determining crosstalk at the WIPP
  - Purpose and method of performing voltage plateau
  - Exam

2. Dosimetry (CL2.04) . 4 hours

a. Prerequisites - None

b. Scope - This lesson introduces the types of dosimeters used to measure external radiation to people at the facility. The material presented in this lesson is valuable to RCTs since dosimeters are the only direct method to measure and document personnel radiation exposure and ensure regulatory compliance with applicable limits.

c. Outline - Introduction
- DOE occupational worker external exposure limits
- DOE established limits for embryo/fetus
- WIPP administrative exposure control guidelines for radiation/non-radiation workers, incidents and emergencies, and unborn children
- Requirements for pregnant worker
- Theory of operation of a TLD
- Theory of operation of a TLD reader
- Advantages and disadvantages of a TLD
- WIPP beta-gamma TLDs
- WIPP neutron TLDs
- WIPP TLD use requirements
- WIPP personnel neutron dosimeter types and principle of operation
- WIPP self-reading dosimetry (SRD) principle of operation
- WIPP alarming dosimeter use guidelines and principle of operation
- WIPP bioassay monitoring methods
- Exam

3. Contamination Control (CL2.05) . 4 hours

a. Prerequisites - None

b. Scope - This lesson shows that contamination control is probably one of the most difficult and challenging tasks the RCTs will encounter. This lesson covers the methods to prevent personnel contaminations and releases of radioactive material into the environment which is the ultimate purpose of a radiological control organization.

c. Outline - Introduction
- Removable and fixed surface contamination
- Components of the radiation monitoring program
- Basic goal of the program
- Basic principles
- Possible engineering control methods
- Use of protective clothing
- Basic factors which determine protective clothing requirements
- Exam

4. Airborne Sampling Program/Methods (CL2.06) . 4 hours

a. Prerequisites - None

b. Scope - This lesson provides an overview of the air sampling program and the methods for obtaining airborne radioactivity concentration in an area to ensure that the control measures assigned are effective and continue to be effective.

c. Outline - Introduction

- Primary objectives of air monitoring program
- Three physical states of radiation contaminants
- Ensuring a representative air sample
- Defining “isokinetic sampling”
- Six methods for obtaining samples and their principle of operation
- Selection of air monitoring methods
- Purpose of five types of samplers/monitors
- Factors affecting accuracy of measurements
- WIPP air monitoring program
- Exam

5. Airborne Sampling Laboratory (CL2.06A) . 4 hours

a. Prerequisites - None
b. Scope - This training laboratory provides the initial on-the-job training for the job performance measures (JPMs) pertaining to the Airborne Sampling Program/Methods.
c. Outline - Introduction
   - Collecting FAS filters
   - Analyzing air sample for radioactivity
   - Changing ‘Station A’ FAS filters
   - Determining appropriate respiratory equipment based on air activity

6. Radiological Source Control (CL2.08) . 4 hours

a. Prerequisites - None
b. Scope - This lesson provides an understanding of the purposes, uses, methods to control radioactive sources that are necessary at a nuclear facility.
c. Outline - Introduction
   - N41.1 requirements for radioactive sources
   - WIPP sources that must be controlled
   - Packaging, marking and labeling requests
   - Storage area approval and posting requests
   - WIPP procedures for storage and accountability of radioactive sources
   - Exam

7. Access Control and Work Area Setup (CL2.10) . 4 hours

a. Prerequisites - None
b. Scope - This lesson presents instruction in Radiological Work Permits, various types of postings used in radiological areas, setting up radiological areas, access controls, and releasing of material from radiological areas.
c. Outline - Introduction
   - Purpose and information on Radiological Work Permit (RWP) including WIPP classifications
   - Responsibilities in using or initiating RWP
   - WIPP document that governs our ALARA program
   - WIPP establishment of exposure/performance goals

- WIPP conditions requiring a pre-job ALARA review
- WIPP conditions requiring a post-job ALARA review
- Purpose of postings, signs, labels and barricades; and RCTs responsibilities for them
- WIPP postings, requirements for postings/barriers, and entry requests for various radiological areas
- Setting up radiological areas
- Containment device discrepancies
- Setting up portable ventilation systems and count rate meters
- Requirements while working in RBAs
- Requirements for removing or releasing materials from any radiological area
- Exam

8. Radiological Work Coverage (CL2.11) . 4 hours

a. Prerequisites - None
b. Scope - This lesson covers the methods of job coverage by RCTs to assist radiological workers in keeping their radiation exposures ALARA.
c. Outline - Introduction
   - Three purposes of job coverage
   - Continuous and intermittent job coverage
   - Conditions that require job coverage
   - Planning job coverage
   - Pre-job briefing discussions
   - Worker and technician exposure control techniques
   - WIPP in-progress radiological surveys
   - WIPP documentation of in-progress surveys
   - Actions taken for unexpected survey results
   - Contamination control techniques
   - Preventative job coverage techniques
   - Overall job control techniques
   - WP 12-5 reasons to stop radiological work activities
   - Exam

9. Shipment/Receipt of Radioactive Material (CL2.12) . 4 hours

a. Prerequisites - None
b. Scope -
c. Outline - Introduction
   - Regulatory agencies for radioactive material transport
   - Defining the DOT terms: LSA, Limited Quantity, Transport Index, Exclusive Use, and Closed Transport Vehicle
   - Determining radionuclide contents of a package
   - Radiation and contamination surveys and applicable limits performed on packages
   - Radiation and contamination surveys and applicable limits performed on exclusive use vehicles

- Placement of placards on transport vehicles
- WIPP shipment release inspection criteria
- WIPP procedures for receipt and shipment
- WIPP procedures for shipments exceeding limits
- WIPP procedures for opening packages
- Exam

10. Radiological Incidents and Emergencies (CL2.13) . 4 hours

a. Prerequisites - None
b. Scope - This lesson covers the necessary immediate and supplementary actions for responding to radiological emergencies and abnormal events. This lesson also reveals that, although most people do not take incident response planning seriously because they do not expect the unexpected, incidents do occur, and experience has shown that best response comes from workers who have prepared themselves with a plan for dealing with incidents.
c. Outline - Introduction
   - RCT general response and responsibilities
   - Emergency equipment and facilities, including location and contents of emergency equipment kits
   - RCT response to CAM alarm
   - RCT response to personnel contamination monitor alarm
   - RCT response to off scale or lost dosimetry
   - RCT response to radiation levels or area alarm
   - RCT response to dry or liquid spill
   - RCT response to fire in a radiological area or involving radioactive materials
   - RCT response to other incidents
   - Emergency response levels
   - Incident documentation procedures
   - Emergency response team structure
   - Offsite incident support groups
   - Plant incidents, including cause, prevention, and response
   - Exam

11. Personnel Decontamination (CL2.14) . 4 hours

a. Prerequisites - None
b. Scope - This lessons outlines the best methods available to control or oversee the decontamination of a contaminated individual.
c. Outline - Introduction
   - Three factors in personnel decontamination
   - Required RCT preliminary actions and notifications for contaminated individual
   - RCT response to clothing contamination
   - RCT response to skin contamination
   - Using decontamination reagents to decontaminate personnel
   - Exam

12. Radiological Considerations for First Aid (CL2.15) . 4 hours

a. Prerequisites - None
b. Scope - This lesson introduces the special considerations for injuries in radiological areas. It is incumbent on the RCT to use his/her knowledge and training to make judgement calls based on available facts and conditions. Often there is more than one "right way" to handle the situation, with many alternatives which may all work equally well.
c. Outline - Introduction
   - Treatment of minor radiation injuries
   - Treatment of major radiation illness/injury
   - RCT's responsibility at scene of major radiation injury after arrival of medical personnel
   - WIPP treatment and transport of contaminated injured personnel
   - Exam

13. Radiation Survey Instrumentation (CL2.16) . 4 hours

a. Prerequisites - None
b. Scope - This lesson provides an understanding of radiation survey instruments to ensure the data obtained is accurate and appropriate for the source of radiation. This lesson contains information about widely used portable radiation survey instruments.
c. Outline - Introduction
   - Appropriate external radiation survey instruments and their selection
   - WIPP ion chamber instrument features and specifications
   - WIPP high range instrument features and specifications
   - WIPP neutron detection and measurement instrument features and specifications
   - Exam

14. Contamination Monitoring Instrumentation (CL2.17) . 4 hours

a. Prerequisites - None
b. Scope - This lesson provides an understanding of contamination monitoring (count rate) instruments to provide the basis for assignment of practical contamination and internal exposure controls, to establish the proper controls, and to identify personnel contamination prior to exiting radiological areas at the facility.
c. Outline - Introduction
   - Portable contamination monitoring equipment selection
   - WIPP beta/gamma and/or alpha survey count rate meter probe features and specifications
   - WIPP count rate instrument features and specifications
   - WIPP personnel contamination monitor features and specifications
   - WIPP contamination monitor (tool, bag, laundry monitors) features and specifications
   - Exam

15. Air Sampling Equipment (CL2.18) . 4 hours

a. Prerequisites - None
b. Scope
c. Outline - Introduction
- WIPP portable air sampler (PAS) selection
- Physical and operating characteristics and limitation(s) of WIPP portable air samplers
- Physical and operating characteristics and limitation(s) of WIPP motor air pumps
- Pre-operational checkout of WIPP PASs
- Physical and operating characteristics and limitation(s) of WIPP beta-gamma CAMs
- Physical and operating characteristics and limitation(s) of WIPP alpha CAMs
- Exam

16. Counting Room Equipment (CL2.19) . 4 hours

a. Prerequisites - None
b. Scope - This lesson covers counting room equipment in relation to types used, purpose for, radiation monitored, operational requirements, and specific limitations and characteristics. The RCT uses information from these counting instruments to identify and assess the hazards presented by contamination and airborne radioactivity and establish protective requirements for work performed in radiological areas.
c. Outline - Introduction
- WIPP Scintillation Alpha and Beta laboratory counter/scalers' features and specifications
- WIPP low background auto alpha/beta proportional counting system features and specifications
- Exam

COURSE: Radiography

TYPE: Classroom/OJT

OBJECTIVES: Upon completion of this course, the student will be able to perform radiography in a safe manner and will be able to confirm whether waste contains ignitable, corrosive, or reactive waste.

Successfully pass a comprehensive exam based upon training enabling objectives. The comprehensive exam will address the radiography operation, documentation, and procedural elements stipulated in this WAP.

Perform practical capability demonstration in the presence of appointed site Permittee radiography subject matter expert.

REFRESHER: Biennially

COURSE DESCRIPTION

Radiography operators shall be instructed in the specific waste generating practices and typical packaging configurations expected to be found in each Waste Matrix Code at each site shipping waste to WIPP. The OJT and apprenticeship shall be conducted by an experienced, qualified radiography operator prior to qualification of the training candidate.

The Permittees' radiography training program includes:

Formal Training

- Project Requirements
- State and Federal Regulations
- Basic Principles of Radiography
- Radiographic Image Quality
- Radiographic Scanning Techniques
- Application Techniques
- Radiography of Waste Forms
- Standards, Codes, and Procedures for Radiography
- Waste Stream-Specific Instruction

On-the-Job Training

- System Operation
- Identification of Packaging Configurations
- Identification of Waste Material Parameters/Waste Matrix Codes
- Identification of excess residual liquids as defined in the TSDF-WAC, sealed containers greater than four liters (nominal), and compressed gases
- Verification of waste stream description

A radiography test drum shall include items common to the waste streams to be confirmed by the Permittees. The test drums shall be divided into layers with varying packing densities or different drums may be used to represent different situations that may occur during radiography examination by the Permittees. The following elements will be in a radiography test drum(s):

- Aerosol can with puncture
- Horsetail bag
- Pair of coveralls
- Empty bottle
- Irregular shaped pieces of wood
- Empty one gallon paint can
- Full container
- Aerosol can with fluid
- One gallon bottle with three tablespoons of fluid
- One gallon bottle with one cup of fluid (upside down)
- Leaded glove or leaded apron
- Wrench

These items shall be successfully identified by the operator as part of the qualification process.

Requalification of operators shall be based upon evidence of continued satisfactory performance (primarily video/audio reviews) and shall be done at least every two years. Unsatisfactory performance will result in disqualification. Unsatisfactory performance is defined as the misidentification of excess residual liquids (as defined in the TSDF-WAC), sealed containers greater than four liters (nominal), except for inorganic solids packaging in metal cans, or compressed gases) in a training drum or a score of less than eighty percent (80%) on the comprehensive exam. Retraining and demonstration of satisfactory performance are required before a disqualified operator is again allowed to operate the radiography system for the Permittees.

COURSE: Visual Examination

TYPE: Classroom/OJT

OBJECTIVES: Upon completion of this course, the student will be able to perform visual examination or a review of visual examination records in a safe manner and will be able to confirm whether waste contains ignitable, corrosive, or reactive waste.

Successfully pass a comprehensive exam based upon training enabling objectives. The comprehensive exam will address the visual examination operation, documentation, and procedural elements stipulated in this WAP.

Perform practical capability demonstration in the presence of appointed site Permittee visual examination subject matter expert.

REFRESHER: Biennially

COURSE DESCRIPTION

Visual examination operators shall be instructed in the specific waste generating processes, typical packaging configurations, and expected waste material parameters expected to be found in each Waste Matrix Code in the waste stream being confirmed using visual examination.

The OJT and apprenticeship shall be conducted by an operator experienced and qualified in visual examination prior to qualification of the candidate. The training shall be site waste stream specific to include the various waste configurations being confirmed. For example, the particular physical forms and packaging configurations at each site will vary so operators shall be trained on types of waste that are generated, stored, and/or characterized at that particular site.

Visual examination personnel shall be requalified once every two years.

The visual examination training program includes:

Formal Training

- Project Requirements
- State and Federal Regulations
- Application Techniques
- Waste Stream-Specific Instruction (e.g., specific waste generating processes, typical packaging configurations, waste material parameters)

On-the-Job Training

- Identification of Packaging Configurations
- Identification of Waste Material Parameters/Waste Matrix Code

- Identification of Prohibited Items liquids as defined in the TSDF-WAC, sealed containers greater than four liters (nominal), and compressed gases
- Verification of waste stream description

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Qualification Cards

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QUALIFICATION CARD:	CH Waste Handling Technician (WH-01A, WH-01B) CH Waste Handling Engineer (WH-02)
DURATION:	Nine to twelve months
CLASSROOM TRAINING:	Various classroom courses are utilized to provide operators the requisite training as part of the qualification process. The candidate must satisfactorily complete the classroom training courses prior to completion of the qualification card.
SCOPE:	The CH Waste Handling Technician Qualification Card (WH-01A Backfill Technician, and Emplacement Technician, and WH-01B Waste Handling Technician) and CH Waste Handling Engineer Qualification Card (WH-02 Waste Handling Operations Qualification Card Guide Book [WH-GUIDE-1]).
REFERENCES:	CH Waste Handling Technician Qualification Card (WH-01) CH Waste Handling Engineer Qualification Card (WH-02) Waste Handling Operations Qualification Card Guide Book (WH-GUIDE-1)

QUALIFICATION CARD DESCRIPTION (by category)

1. Equipment Knowledge Requirements

Demonstrate knowledge of the following for the various pieces of CH waste handling equipment and systems:

- General principle of equipment operation
- Understanding of alarms, indications, and readings
- Proper response to abnormal equipment conditions
- Precautions, administrative requirements, and technical specification requirements
- Basic safety requirements for equipment operation

2. Equipment Operation Practical Requirements

Demonstrate competency in conducting CH waste handling equipment and system functional and operational inspections.

Demonstrate competency in standard operation of CH waste handling equipment and systems.

3. Integrated Process Knowledge Requirements

Demonstrate knowledge of the following for the various integrated support functions.

- Administrative activities for equipment/system isolation, modification and control
- Management of site derived waste
- Proper response to abnormal facility conditions
- Container storage area inspections
- Facility support systems

4. Integrated Process Practical Requirements

Demonstrate competency in performing administrative duties for equipment/system isolation and control.

Demonstrate competency in management of site derived waste.

Demonstrate competency in performing container storage area inspections.

Walkdown the various facility support systems that affect waste handling.

QUALIFICATION CARD: RH Waste Handling Technician (RH-01A, RH-01B, RH-01C)
RH Waste Handling Engineer (RH-02)

DURATION: Nine to twelve months

CLASSROOM TRAINING: Various classroom courses are utilized to provide operators the requisite training as part of the qualification process. The candidate must satisfactorily complete the classroom training courses prior to completion of the qualification card.

SCOPE: The RH Waste Handling Technician Qualification Card (RH-01A, RH-01B, RH-01C) and RH Waste Handling Engineer Qualification Card (RH-02).

REFERENCES: RH Waste Handling Technician Qualification Card
RH Waste Handling Engineer Qualification Card
Waste Handling Operations Qualification Card Guide Book

QUALIFICATION CARD DESCRIPTION (by category)

1. Equipment Knowledge Requirements
Demonstrate knowledge of the following for the various pieces of RH waste handling equipment and systems:

- General principle of equipment operation
- Understanding of alarms, indications, and readings
- Proper response to abnormal equipment conditions
- Precautions, administrative requirements, and technical specification requirements
- Basic safety requirements for equipment operation

2. Equipment Operation Practical Requirements

Demonstrate competency in conducting RH waste handling equipment and system functional and operational inspections.

Demonstrate competency in standard operation of RH waste handling equipment and systems.

3. Integrated Process Knowledge Requirements

Demonstrate knowledge of the following for the various integrated support functions.

- Administrative activities for equipment/system isolation, modification and control
- Management of site derived waste
- Proper response to abnormal facility conditions
- Container storage area inspections
- Facility support systems

4. Integrated Process Practical Requirements

Demonstrate competency in performing administrative duties for equipment/system isolation and control.

Demonstrate competency in management of site derived waste.

Demonstrate competency in performing container storage area inspections.

Walkdown the various facility support systems that affect waste handling.

QUALIFICATION CARD: Radiological Control Technician (RCT)

DURATION: . 9 working months

CLASSROOM TRAINING: Various classroom courses are utilized to reinforce the training received as part of the qualification card. The candidate is required to complete

SCOPE:

REFERENCES: WP 12-5, WIPP Radiological Control Manual
WP 12-HP, WIPP OHP Procedures Manual
WP 12-RE, Rad Engineering Procedures Manual

QUALIFICATION CARD DESCRIPTION (by category)

1. Academics Training

There are 13 lessons associated with the core academics program and 15 lessons associated with the site academics program.

2. Practical Training

There are 33 job performance measures associated with the practical training element of the RCT qualification program covering the following areas:

Demonstrate generation of a Radiological Work Permit.

Demonstrate how a radiological area should be posted.

Demonstrate applicable emergency response to various events.

Demonstrate competency in operating various types of monitoring equipment.

3. Written Examination

This exam is administered after successful completion of academic lessons and practical lessons. Successful completion of the comprehensive written exam is necessary prior to participation in the oral examinations.

4. Oral Examination Board

The oral board consists of members of Radiation Safety, Operational Health Physics, Facility Operations, and Technical Training. This board will assess the candidate's response to normal and emergency situations encountered by a Radiation Control Technician.

QUALIFICATION CARD: EST-01 Emergency Services Technician

DURATION: 2 Years

PREREQUISITES: The candidate must be current in CPR and possess an EMT-I License.

CLASSROOM TRAINING: Additional classroom training courses are required prior to completion of this qualification card.

SCOPE: This qualification card must be completed by all candidates prior to standing a watch unsupervised. Qualification is a six month process. The individual may perform duties without direct supervision only for those evolutions and/or operations for which training has been completed.

All signatures must be made by an approved Subject Matter Expert. The signatures indicate that the trainee has demonstrated satisfactory knowledge and performance of the task(s) indicated.

REFERENCES: Emergency Services Technician Qualification Card Guide Book (EST-01G)
WIPP Emergency Management Program (WP 12-9)
Emergency Fire Pump (WP 04-FP2202)
Inspection and Testing of Sprinkler Systems
1. Wet Pipe Fire Sprinkler System Testing (PM000025)
2. NFPA 13, Installation of Sprinkler Systems

QUALIFICATION CARD DESCRIPTION (by category)

1. Knowledge Requirements

Demonstrate basic knowledge of emergency management procedures and protocols such as:

- The purpose and types of dry chemicals utilized in large and portable dry chemical systems.
- Inspection and testing principles of sprinkler systems, buildings, pull boxes, and fire detection systems.
- The general operation and hazards of fixed halon systems.
- Principles and procedures for operation of various fire and rescue apparatus.
- Selection and use of personal protective equipment.
- Selection and use of hazardous material equipment and supplies for control and mitigation.

2. Practical Requirements

Demonstrate competency in the following areas:

- Use of fire suppression apparatus and equipment.
- Use of rescue apparatus and equipment.
- Inspection and testing techniques and completion of corresponding forms.
- Operation of ambulance and operation and application of all ambulance equipment and supplies.
- Application of all hazardous materials equipment and supplies for control and mitigation.

QUALIFICATION CARD: FPT-01 Fire Protection Technician

DURATION: 2 Years

PREREQUISITES: The candidate must be currently certified in CPR and possess an EMT-B License.

CLASSROOM TRAINING: Additional classroom training courses are required prior to completion of this qualification card.

SCOPE: This qualification card must be completed by all candidates prior to standing a watch unsupervised. Qualification is a six month process. The individual may perform duties without direct supervision only for those evolutions and/or operations for which training has been completed.

All signatures must be made by an approved Subject Matter Expert. The signatures indicate that the trainee has demonstrated satisfactory knowledge and performance of the task (s) indicated.

REFERENCES: Emergency Services Technician Qualification Card Guide Book (EST-01G)
WIPP Emergency Management Program (WP 12-9)

QUALIFICATION CARD DESCRIPTION (by category)

1. Knowledge Requirements

Demonstrate basic knowledge of emergency management procedures and protocols such as:

- The purpose and types of dry chemicals utilized in large and portable dry chemical systems.
- Inspection and testing principles of sprinkler systems, buildings, pull boxes, and fire detection systems.
- The general operation and hazards of fixed halon systems.
- Principles and procedures for operation of various fire and rescue apparatus.
- Selection and use of personal protective equipment.
- Selection and use of hazardous material equipment and supplies for control and mitigation.

2. Practical Requirements

Demonstrate competency in the following areas:

- Use of fire suppression apparatus and equipment.
- Use of rescue apparatus and equipment.
- Inspection and testing techniques and completion of corresponding forms.
- Operation of ambulance and operation and application of all ambulance equipment and supplies.
- Application of all hazardous materials equipment and supplies for control and mitigation.

QUALIFICATION CARD: Quality Assurance Inspector

DURATION: Six to nine months

CLASSROOM TRAINING: Various formal classroom courses are utilized to support the training received as part of the qualification card. The candidate is required to complete the classroom training courses, satisfactorily, prior to completion of the qualification card.

SCOPE: The Quality Assurance Qualification card establishes the minimum education, skill, training, knowledge, and experience requirements for Quality Assurance personnel who perform inspection activities.

REFERENCES: WP 13-1, Quality Assurance Program Description
QAI PD2-3, Qualification of Inspection Personnel

QUALIFICATION CARD DESCRIPTION (by category)

1. General Knowledge

Demonstrate knowledge of the minimum site specific procedures:

- ASME NQA-1
- Quality Assurance Program Description
- Safety Manual
- Hoisting and Rigging Procedures
- Work Authorization Procedures
- Document Control Procedures

2. On-the-Job Training

Perform at least 20 hours of the following activities while supervised by a qualified inspector:

- Receiving inspection
- Dimensional inspection
- Mechanical inspection
- Electrical inspection
- Civil inspection

3. Qualification Card

Perform the following tasks:

- Receipt inspection
- Conduct an inspection
- Hold/witness point inspection
- Issuance of a corrective action request
- Hold tag issuance
- Verification of corrective action
- Conduct a corrective action receipt inspection

QUALIFICATION CARD: Facility Operations Roving Watch

DURATION: Six to nine months

CLASSROOM TRAINING: Various classroom courses are utilized to reinforce the training received as part of the qualification card. The candidate is required to complete the classroom training courses, satisfactorily, prior to completion of the qualification card.

SCOPE: The Facility Operations Roving Watch qualification is the foundation for all of the Facility Operations qualifications. The qualifications developed utilizing the Facility Operations Roving Watch qualification are the Central Monitoring Room Operator Qualification (FO-CMRO-2) and the Facility Operations Shift Engineer Qualification (FO-FOSE-3) (for FSM). This qualification is used by all Facility Operations personnel qualifying. All of the requirements of the applicable qualifications must be completed by the candidate before operating any equipment or performing any operating evolutions without direct supervision of a qualified operator.

REFERENCES: Facility Operations Roving Watch Qualification Card (FO-RW-1)
WIPP Operations Watchstation Qualification Card Guide Book (FO-GUIDE-1)

QUALIFICATION CARD DESCRIPTION (by category)

1. System Knowledge

Demonstrate knowledge of the critical facility operating systems, such as:

- Theory of the system and equipment
- System design
- Differences in the various building systems around the facility
- Alarms and sequence of actions that follow alarms

The systems covered include:

- Facility electrical and backup electrical systems
- Heating, air conditioning, and ventilation systems
- Underground ventilation systems
- Domestic water and fire protection systems

2. System Operation Practical Evaluation

Demonstrate system startup/shutdown for the various facility systems according to procedures.

Demonstrate maintenance of applicable records pertaining to the operation of facility systems.

Demonstrate ability to conduct periodic required testing of facility systems.

Demonstrate competency to respond to alarms and emergency situations according to procedures.

3. Integrated Plant Knowledge

Discuss the site policies on equipment lockout/tagout.

Discuss the process of notifications and authorizations that is involved in making temporary plant modifications.

Discuss the site process for work authorization.

Discuss the role and responsibilities of Facility Operations on the site.

Discuss Conduct of Operations as it applies to Facility Operations.

4. Integrated Plant Practical Evaluation

Demonstrate the lockout/tagout process.

Prepare paperwork associated with a temporary plant modification.

Demonstrate ability to maintain the Facility Operations logs.

Demonstrate the actions that are taken in various facility emergencies.

Demonstrate ability to stand watch as RW during various shifts.

5. Oral Qualification Exam

This final portion of the qualification consists of an oral board exam conducted by board members who are knowledgeable in the qualification program areas.

QUALIFICATION CARD: Central Monitoring Room Operator

DURATION: Three to five months

CLASSROOM TRAINING: Various classroom courses are utilized to reinforce the training received as part of the qualification card. The candidate is required to complete the classroom training courses, satisfactorily, prior to completion of the qualification card.

SCOPE: The Facility Operations Central Monitoring Room Operator Qualification (FO-CMRO-2) in conjunction with the Roving Watch qualification make up the support for the Facility Operations Shift Engineer Qualification (FO-FOSE-3). This qualification is used by Facility Operations personnel qualifying as CMR operators or Facility Operations Shift Supervisors. All of the requirements of the applicable qualifications must be completed by the candidate prior to operating any equipment or performing any operating evolutions without direct supervision of a qualified operator. Qualification are valid for two years.

REFERENCES: Central Monitoring Room Operator Qualification Card (FO-CMR-2)
WIPP Operations Watchstation Qualification Card Guide Book (FO-GUIDE-1)

QUALIFICATION CARD DESCRIPTION (by category)

1. System Knowledge

Demonstrate knowledge of the following for the various systems in the Central Monitoring Room:

- Theory of the system and equipment
- System design
- Alarms and sequence of actions that follow the alarms

2. System Operation Practical Evaluation

Demonstrate competency in standard operation of the systems in the Central Monitoring Room including obtaining various pieces of information such as:

- System status
- Alarm Status
- Meteorological data

Demonstrate what actions are to take place in the event of an alarm.

Demonstrate storage of information and subsequent retrieval.

3. Integrated Plant Knowledge

State the actions that must be taken to remove a CMS point scan/alarm check.

Discuss the sequence of events that must occur during a facility emergency.

4. Integrated Plant Practical Evaluation

Demonstrate how the CMR log is maintained.

Demonstrate the sequence of events that are involved in CMS point scan/alarm check removal.

Demonstrate ability to stand watch as CMRO during different shifts.

Demonstrate the sequence of events involved in a facility emergency.

5. Oral Qualification Exam

This final portion of the qualification consists of an oral board exam conducted by board members who are knowledgeable in the qualification program areas.

QUALIFICATION CARD: Facility Operations Shift Supervisor

DURATION: Three to five months

CLASSROOM TRAINING: Various classroom courses are utilized to reinforce the training received as part of the qualification card. The candidate is required to complete the classroom training courses, satisfactorily, prior to completion of the qualification card.

SCOPE: The Facility Operations Shift Engineer Qualification (FO-FOSE-3) is the final qualification developed from the Central Monitoring Room Operator Qualification and Roving Watch Qualification. This qualification is used by Facility Operations personnel, Facility Operations Engineer, and Facility Shift Manager. The candidate must be recommended by the Facility Operations Manager to perform this qualification. All of the requirements of the applicable qualifications must be completed by the candidate prior to operating any equipment or performing any operating evolutions without direct supervision of a qualified operator. Qualifications are valid for two years.

REFERENCES: Facility Operations Shift Engineer (FO-FOSE-3)
WIPP Operations Watchstation Qualification Card Guide Book (FO-GUIDE-1)

QUALIFICATION CARD DESCRIPTION (by category)

1. System Knowledge

Completed qualification through Central Monitoring Room Operator Qualification and Roving Watch Qualification

2. System Operation Practical Evaluation

Completed qualification through Central Monitoring Room Operator Qualification and Roving Watch Qualification

3. Integrated Plant Knowledge

Discuss the site work authorization process and the role of the FSM.

Discuss the use of operator aids.

Discuss the responsibilities of the FSM.

Discuss the use of shift instructions.

Discuss the role of the FSM in facility emergencies and the actions that are to be taken by the FSM.

Discuss the role of the Quality Assurance and Safety programs on the site.

Discuss the Contingency Plan and its implementation.

Discuss site regulatory compliance as it applies to hazardous waste and hazardous materials.

4. Integrated Plant Knowledge Evaluation

Complete the required documentation for a lockout/tagout.

Complete the proper documentation relating to temporary plant modifications.

Perform various work authorization actions.

Demonstrate a review of the Facility Operations logs.

Demonstrate the response required for various facility emergencies.

Demonstrate ability to stand watch as FSM during different shifts.

5. Oral Qualification Exam

This final portion of the qualification consists of an oral board exam conducted by board members who are knowledgeable in the qualification program areas.

QUALIFICATION CARD: WWIS Data Administrator

DURATION: Two years

CLASSROOM TRAINING: Various classroom courses are utilized to provide the WWIS Data Administrator with the knowledge and background on the WIPP waste operations. OJT connected with the everyday operation of the database will be provided by the WWIS SME. The candidate must satisfactorily complete the classroom training courses and the OJT prior to qualification.

SCOPE: The WWIS Qualification Card provides the minimum knowledge and competency requirements for qualification. The requirements of the qualification must be completed to the satisfaction of the current WWIS SME prior to the candidate performing any of the WWIS data functions without direct supervision by a qualified WWIS DA.

REFERENCES: WWIS Data Administrator Qualification Card

QUALIFICATION CARD (by category)

1. Equipment Knowledge Requirements

Demonstrate knowledge of the following WWIS hardware and software systems:

- General computer operation principles and communication terminal techniques
- IBM PC and Internet techniques
- Bar Code Reader System operation

2. Equipment Operation Practical

- Obtain and maintain local and Internet IDs
- Access WWIS and produce reports
- Demonstrate operation of bar code reader interface to WWIS

3. Integrated Process Knowledge Requirements

Demonstrate knowledge of the following project document data requirements:

- WIPP Waste Acceptance Criteria
- WIPP Quality Assurance Program Plan
- Waste Analysis Plan

Demonstrate knowledge of the following WWIS Specific documentation:

- WWIS Software Requirements Specification
- WWIS Software Configuration Management Plan
- WWIS Software Quality Assurance Plan
- WWIS Software Design Description

4. Integrated Process Practical Requirements

Demonstrate competency in performing the administrative duties of the WWIS DA

Demonstrate competency in accessing the local area network (LAN) and the Internet.

Demonstrate the WIPP data interface to the WWIS via a walkdown of the receipt and emplacement operations that provide data to the database.

QUALIFICATION CARD: Radioactive Transportation (TE-01)
Federal Motor Carrier Safety Regulations (TE-02)
Hazardous Materials (TE-03)
Hazardous Waste Shipments by Public Highway (TE-05)

DURATION: Six to twelve months

CLASSROOM TRAINING: Various classroom courses are utilized to provide candidates the requisite training as part of the qualification process. The candidate must satisfactorily complete the classroom training courses listed on the individual qualification card as a prerequisite to beginning that process.

SCOPE: The Transportation Engineer qualification cards (TE-01 through TE-05) provide the minimum knowledge and competency requirements for qualification. The requirements of the individual qualification cards must be completed by the candidate prior to performing those duties without direct supervision.

REFERENCES: Radioactive Transportation (TE-01)
Federal Motor Carrier Safety Regulations (TE-02)
Hazardous Materials (TE-03)
Hazardous Waste Shipments by Public Highway (TE-05)

QUALIFICATION CARD DESCRIPTION (by category)

1. Knowledge Requirements

Demonstrate knowledge of the following regulatory arenas:

- Radioactive Material Transportation
- Federal Motor Carrier Safety Regulations
- Hazardous Materials
- Hazardous Waste Shipments by Public Highway

2. Practical Requirements

Demonstrate competency in performing the following for a given shipment:

- Determine the proper shipping name
- Determine the proper labeling and placement requirements
- Determine the proper application and marking requirements
- Prepare the proper shipping documents (i.e., Hazardous Waste Manifest, Bill of Lading, LDR notification form, etc.)

QUALIFICATION CARD: Sampling Team (ST-01)

DURATION: 1 month

PREREQUISITES: HWW-101 - Hazardous Waste Worker/Hazardous Waste Responder

SCOPE: This qualification card must be completed by all candidates prior to performing sampling tasks without the direct supervision of a qualified person. This qualification ensures that the sampler will collect samples in a way that will protect the sampler and the integrity of the sample collected.

REFERENCES: WIPP Sampling Team Qualification Guide ST-01G
WP 02-EC.05 Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling
WP 02-EC.06 WIPP Site Effluent and Hazardous Materials Sampling Plan

QUALIFICATION CARD DESCRIPTION (by category)

1. Knowledge Requirements

Demonstrate basic knowledge of hazardous waste sampling protocol such as:

- Preventing cross-contamination of samples and equipment
- Importance of the a chain-of-custody
- Purpose of the field logbook and documentation
- Labeling and sealing procedures
- Methods of obtaining various sample types (i.e. TCLP organics, volatile organic compounds, TCLP metals)

2. Safety Requirements

Demonstrate knowledge of the safety requirements for sampling activities such as:

- Level of personal protective equipment (PPE) needed for various sampling situations
- Actions to take when encountering damaged or bulging containers
- Importance of the “Buddy System”

3. Practical Requirements

- Correct and safe use of sampling equipment
- Collection of a given sample preventing cross-contamination
- Labeling and sealing sampling containers
- Completion of the Chain-of-Custody form

QUALIFICATION CARD: Sampling Team Assistant (STA-01)

DURATION: 1 month

PREREQUISITES: HWW-101 - Hazardous Waste Worker/Hazardous Waste Responder

SCOPE: This qualification card must be completed by all candidates prior to performing sampling tasks without the direct supervision of a qualified person. This qualification ensures that the sampler will collect samples in a way that will protect the sampler and the integrity of the sample collected.

REFERENCES: WIPP Sampling Team Qualification Guide ST-01G
WP 02-EC.05 Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling
WP 02-EC.06 WIPP Site Effluent and Hazardous Materials Sampling Plan

QUALIFICATION CARD DESCRIPTION (by category)

1. Knowledge Requirements

Demonstrate basic knowledge of hazardous waste sampling protocol such as:

- Preventing cross-contamination of samples and equipment
- Importance of the chain-of-custody
- Purpose of the field logbook and documentation
- Labeling and sealing procedures
- Methods of obtaining various sample types (i.e., TCLP organics, volatile organic compounds, TCLP metals)

2. Safety Requirements

Demonstrate knowledge of the safety requirements for sampling activities such as:

- Level of personal protective equipment (PPE) needed for various sampling situations
- Actions to take when encountering damaged or bulging containers
- Importance of the “Buddy System”

3. Practical Requirements

- Correct and safe use of sampling equipment
- Collection of a given sample preventing cross-contamination
- Labeling and sealing sampling containers
- Completion of the Chain-of-Custody form

QUALIFICATION CARD: Waste Handling Hoist Equipment Operator

DURATION: Approximately 12 to 15 months

SCOPE: The Waste Handling Hoist Equipment Operator Qualification (M-30) prepares the candidate to be a qualified man-hoist operator. All of the requirements for the applicable qualification must be completed prior to operating the Waste Handling Hoist unless under the direct supervision of a qualified operator.

REFERENCES: Waste Handling Hoist Equipment Operator Qualification Card Guide (M-30G)
Waste Handling Shaft Operation Procedure

QUALIFICATION CARD DESCRIPTION (by category)

1. Equipment Knowledge

Demonstrate knowledge of the following systems associated with the Waste Hoist:

- Major components of the Waste Hoist in the headframe and collar areas
- Major components of the Waste Hoist electrical systems
- Be able to describe the correct operations of all Waste Hoist systems and their interrelationships

2. Equipment Safety

Demonstrate knowledge of all safety systems associated with the Waste Hoist and how their functions affect hoist operation.

Describe the correct response of the operator when safety features are actuated.

3. Equipment Practical

Perform normal startup and shutdown of all Waste Hoist systems.

Perform normal hoisting operations for material and personnel in all modes of operation.

4. Classroom Training

Receive formal training in electrical safety.

5.Required Reading

Read the appropriate related procedures for waste hoist operation.

QUALIFICATION CARD: Waste Handling Shaft Tender Operator

DURATION: Approximately 7 months

SCOPE: The Waste Handling Shaft Tender Operator Qualification (M-31) prepares the candidate to operate controls and systems located at both the collar area (surface) and the station area (underground) at the Waste Shaft. All the requirements for this qualification must be completed prior to operation of Waste Shaft systems unless under the direct supervision of a qualified operator.

REFERENCES: Waste Handling Shaft Tender Qualification Guide (M-31G)
Waste Handling Shaft Operation Procedure

QUALIFICATION CARD DESCRIPTION (by category)

1. Equipment Knowledge

Demonstrate knowledge of the following Waste Shaft equipment at the collar and station:

- Waste Shaft controls
- Communication systems
- Conveyance control panels
- Cage and its capacity

2. Equipment Safety

Demonstrate knowledge of all safety systems and devices associated with the Waste Hoist.

Describe the position responsibilities with regard to shaft safety and who to contact during abnormal conditions.

3.Personnel Safety

Demonstrate knowledge of the requirements for all personnel who wish to enter the underground via the Waste Shaft.

Demonstrate knowledge of actions required during all work in and around the Waste Shaft or surrounding areas.

4. Equipment Maintenance

Describe the maintenance and inspection duties of both the collar and station tender.

5. Equipment Practical

Perform pre-shift inspections of the collar and station areas.

Perform all record keeping duties of the shaft tender.

Demonstrate proper operation of the Local Control Stations, Pivot Rail System, and Bell Systems.

ATTACHMENT I

CLOSURE PLAN

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ATTACHMENT I

CLOSURE PLAN

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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 ~~placing~~ constructing closures in each of the ~~occurs as~~ 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 ~~Final~~ closure at the end of the Disposal Phase, which will entail "clean" closure of ~~the two~~ all remaining surface storage units ~~on the surface~~ 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 ~~8~~ 7, each consisting of seven rooms. ~~In addition, the disposal area access drifts shown as E-300, E-140, W-30, and W-170 between S-1600 and S-3650 on Figure I-1 may, at some time in the future, be needed for waste disposal. These access drifts, if used for disposal, are also subject to this Closure Plan.~~

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

[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.

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 is complete and has been certified in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.115), a copy of the approved Closure Plan and all approved revisions will be on file at the WIPP facility and will be available to the Secretary of the NMED or the EPA Region VI Administrator upon request.

I-1 Closure Plan

This Closure Plan is prepared in accordance with the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264 Subparts G, I, and X), Closure and Post-Closure, Use and Management of Containers, and Miscellaneous Units. The WIPP underground HWDUs, including Panels 1 through 7 ~~8 and the disposal area access drifts, designated as Panels 9 and 10~~ on Figure I-1, will be closed under this permit to meet the performance standards in 20.4.1.500 NMAC (incorporating 40 CFR §264.601). The WIPP surface facilities, including Waste Handling Building Container Storage Unit and the Parking Area Container Storage Unit, will be closed in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.178). The Permittees may perform partial closure of the WHB and PAU HWMUs prior to final facility closure and certification. For final facility closure, this plan also includes closure of future waste disposal areas including Panels 8 through 10 and closure and sealing of the facility shafts in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.601).

Following completion of waste emplacement in each underground HWDU, the HWDU will be closed. The Permittees will notify the NMED of the closure of each underground HWDU as specified in the schedule in Figure I-2. For the purpose of this Closure Plan, panel closure is defined as the process of rendering underground HWDUs in the repository inactive and closed according to the facility Closure Plan. The Post-Closure Plan (Permit Attachment J) addresses requirements for future monitoring that are deemed necessary for the post-closure period, including monitoring closed panels prior to final facility closure.

For the purposes of this Closure Plan, final facility closure is defined as closure that will occur when all waste disposal areas are filled or when the WIPP achieves its capacity of 6.2 million cubic feet (ft^3) (175,600 cubic meters (m^3)) of TRU waste. At final facility closure, the surface container storage areas will be closed, and equipment that can be decontaminated and used at other facilities will be cleaned and sent off site. Equipment that cannot be decontaminated plus any derived waste resulting from decontamination will be placed in the last open underground HWDU. Stockpiled salt may be placed in the underground; it may be used as the core material for the berm component of the permanent marker system; or it must be otherwise disposed of in accordance with Sections 2 and 3 of the Minerals Act of 1947 (30 U.S.C. §§602 and 603). In addition, shafts and boreholes which lie within the WIPP Site Boundary and penetrate the Salado will be plugged and sealed, and surface and subsurface facilities and equipment will be decontaminated and removed. Final facility closure will be completed to demonstrate compliance with the Closure Performance Standards contained in 20.4.1.500 NMAC (incorporating 40 CFR §264.111, 178, and 601).

In the event the Permittees fail to obtain an extension of the hazardous waste permit in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.51) or fail to obtain a new permit in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.10(h)), the Permittees will seek a modification to this Closure Plan in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.42) to accommodate a contingency closure. Under contingency closure, storage units will undergo clean closure in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.178); waste handling equipment, shafts, and haulage ways will be inspected for hazardous waste residues (using, among other techniques, radiological surveys to indicate potential hazardous waste releases as described in Permit Attachment I3) and decontaminated as necessary~~,~~; and underground HWDUs that contain radioactive mixed waste will be closed in accordance with the panel closure design described in this Closure Plan. Final facility closure, however, will be redefined and a request for a time extension for final closure will be requested. A copy of this Closure Plan will be maintained by the Permittees at the WIPP facility and at the Department of Energy (**DOE**) Carlsbad Field Office. The primary contact person at the WIPP facility is:

Manager, Carlsbad Field Office
U.S. Department of Energy
Waste Isolation Pilot Plant
P. O. Box 3090
Carlsbad, New Mexico 88221-3090
(505) 234-7300

I-1a Closure Performance Standard

The closure performance standard specified in 20.4.1.500 NMAC (incorporating 40 CFR §264.111), states that the closure shall be performed in a manner that minimizes the need for further maintenance; that minimizes, controls, or eliminates the escape of hazardous waste; and that conforms to the closure requirements of §264.178 and §264.601. These standards are discussed in the following paragraphs.

I-1a(1) Container Storage Units

~~Closure~~ Final or partial closure of the permitted container storage units (the Waste Handling Building Unit and Parking Area Unit) will be accomplished by removing all waste and waste residues. Indication of waste contamination will be based, among other techniques, on the use of radiological surveys as described in Permit Attachment I3. Radiological surveys use very sensitive radiation detection equipment to indicate if there has been a potential release of TRU mixed waste, including hazardous waste components, from a container. This allows the Permittees to indicate potential releases that are not detectable from visible evidence such as stains or discoloration. Visual inspection and operating records will also be used to identify areas where decontamination is necessary. Contaminated surfaces will be decontaminated until radioactivity is below free release limits[2]. Once surfaces are determined to be free of radioactive waste constituents, they will be tested for hazardous waste contamination. These surface decontamination activities will ensure the removal of waste residues to levels protective of

[2] The free release criteria for items, equipment, and areas is < 20 dpm/100 cm^2 for alpha radioactivity and < 200 dpm/100 cm^2 for beta-gamma radioactivity.

human health and the environment. The facility is expected to require no decontamination at closure because any waste spilled or released during operations will be contained and removed immediately. Solid waste management units associated described in Permit Module VII will be subject to closure. In the event portions of these units which require decontamination cannot be decontaminated, these portions will be removed and the resultant wastes will be managed as appropriately.

Once the container storage units are decontaminated and certified by the Permittees to be clean, no further maintenance is required. The facilities and equipment in these units will be reused for other purposes as needed.

I-1a(2) Miscellaneous Unit

Post-closure migration of hazardous waste or hazardous waste constituents to ground or surface waters or to the atmosphere, above levels that will harm human health or the environment, will not occur due to facility engineering and the geological isolation of the unit. The engineering aspects of closure are centered on the use of panel closures on each of the underground HWDUs and final facility seals placed in the shafts. The design of the panel closure system is based on the criteria that the closure system for closed underground HWDUs will prevent migration of hazardous waste constituents in the air pathway in concentrations above health-based levels beyond the WIPP land withdrawal boundary during the thirty-five (35) year operational and facility closure period and to withstand any flammable gas deflagration that may occur prior to final facility closure.

Consistent with the definitions in 20.4.1.101 NMAC (incorporating 40 CFR §260.10), the process of panel closure is considered partial closure because it is a process of rendering a part of the repository inactive and closed according to the approved underground HWDU partial closure plan. Panel closure will be complete when the panel closure system is emplaced and operational, when that underground HWDU and related equipment and structures have been decontaminated (if necessary), and when the NMED has been notified of the closure.

Shaft seals are designed to provide effective barriers to the inward migration of ground water and the outward migration of gas and contaminated brine over two discrete time periods. Several components become effective immediately and are expected to function for one hundred (100) years. Other components become effective more slowly, but provide permanent isolation of the waste. The final shaft seal design is specified in Permit Attachment I2.

The facility will be finally closed (i.e., decontaminated and decommissioned) to minimize the need for continued maintenance. Protection of human health and the environment includes, but is not limited to:

- Prevention of any releases that may have adverse effects on human health or the environment due to the migration of waste constituents in the groundwater or in the subsurface environment [20.4.1.500 NMAC, incorporating 40 CFR §264.601(a)].

- Prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in surface water, in wetlands, or on the soil surface [20.4.1.500 NMAC, incorporating 40 CFR §264.601(b)].

- Prevention of any release that may have adverse effects on human health or the environment due to migration of waste constituents in the air [20.4.1.500 NMAC, incorporating 40 CFR §264.601(c)].

As part of final facility closure, surface recontouring and reclamation will establish a stable vegetative cover, and further surface maintenance will not be necessary to protect human health and the environment. Prior to cessation of active controls, monuments will be emplaced to serve as long-term site markers to discourage activities that would penetrate the facility or impair the ability of the salt formation to isolate the waste from the surface environment for at least 10,000 years. The Federal government will maintain administrative responsibility for the repository site in perpetuity and will limit future use of the area.

If, during panel or final facility closure activities, unexpected events require modification of this Closure Plan to demonstrate compliance with closure performance standards, a Closure Plan amendment will be submitted in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.42).

I-1a(3) Post-Closure Care

The post-closure care period will begin after completion of the first panel closure and will continue for thirty (30) years after final facility closure. The post-closure care period may be shortened or lengthened at the discretion of the regulatory agency based on evidence that human health and the environment are being protected or that they are at risk. During the post-closure period, the WIPP shall be maintained in a manner that complies with the environmental performance standards in 20.4.1.500 NMAC (incorporating 40 CFR §264.601). Post-closure activities are described in Permit Attachment J.

I-1b Requirements

The Permit specifies a sequential process for the closure of individual HWMUs at the WIPP. Each underground HWDU will undergo panel closure when waste emplacement in that panel is complete. Following waste emplacement in each underground HWDU, construction-side ventilation will be terminated and waste-disposal-side ventilation will be established in the next underground HWDU to be used, and the underground HWDU containing the waste will be closed. The Permittees will notify the NMED of the closure of each of the underground HWDUs as they are sequentially filled on a HWDU-by-HWDU basis. The HWMUs in the WHB and in the parking area will be closed as part of final facility closure of the WIPP facility.

The Permittees will notify the Secretary of the NMED in writing at least sixty (60) days prior to the date on which closure activities are scheduled to begin.

I-1c Maximum Waste Inventory

The WIPP will receive no more than 6.2 million ft^3 (175,600 m^3) of TRU mixed waste, which may include up to 250,000 ft^3 (7,080 m^3) of remote-handled (**RH**) TRU mixed waste. Excavations are mined as permitted when needed during operations to maintain a reserve of disposal areas. The amount of waste placed in each room is limited by structural and physical considerations of equipment and design. Waste volumes include waste received from off-site generator locations as well as derived waste from disposal and decontamination operations. ~~Maximum waste volumes in the disposal panels are calculated as follows: for 100 percent 55-gallon drums--11,502 7-packs consisting of 80,514 drums and 591,800 ft^3 (16,760 m^3) of waste; for 100 percent standard waste boxes (**SWB**)--11,580 SWBs and 767,750 ft^3 (21,740 m^3) of waste. Since the waste can arrive in any combination of 7-packs and SWBs, a fixed volume is not set for each panel. Furthermore, the placement of backfill materials to modify chemical nature of brines over the long-term will likely result in fewer containers per panel as described in Permit Attachment M2.~~ The maximum volume of TRU mixed waste in a disposal panel is established in Module IV, Table IV.A.1 For closure planning purposes, a maximum achievable volume of 685,100 ft^3 (19,400 m^3) of TRU mixed waste per panel is used. This equates to ~~662,400~~ 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. ~~81,000 containers were assumed in design calculations since, for air dispersion modeling, it is important to maximize the number of container vents through which volatile organic compounds (**VOC**) may be released. In reality, using the 40 percent-60 percent mix, there would be only 51,000 containers in a panel, containing 56,000 vents (2 vents per SWB).~~

The maximum extent of operations during the term of this permit is expected to be Panels 1 through 7 ~~10~~ 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 ~~two~~ 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 five years after completion of their respective explosion isolation wall.

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; disposal of decontamination derived wastes in the last open underground HWDU; and subsequent closure of this underground HWDU. Subsequent activities will include installation of repository shaft seals.

An overall schedule for final facility closure, showing currently scheduled dates for the start and end of final facility closure activities is shown in Table I-2. The dates assume a start up date of March 1999 and hazardous waste permit effective dates of September 1999, September 2009, and September 2019. Details for panel closures are shown on Table I-1.

I-1d(3) <u>Extension for Closure Time</u>

As indicated by the closure schedule presented in Figure I-3, the activities necessary to perform facility closure of the WIPP facility will require more than one hundred eighty (180) days to complete because of additional stringent requirements for managing radioactive materials. Therefore, the Permit provides an extension of the 180-day final closure requirement in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.113). During the extended closure period, the Permittees will continue to demonstrate compliance with applicable permit requirements and will take all steps necessary to prevent threats to human health and the environment as a result of TRU mixed waste management at the WIPP facility including all of the applicable measures in Permit Attachment E (Preparedness and Prevention).

In addition, according to the schedules in Figure I-3, the final derived wastes that are generated as the result of decontamination activities will not be disposed of for sixteen (16) months after the initiation of final facility closure. In accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.113(a)), the Permit provides an extension of the 90-day limit to dispose of final derived waste resulting from the closure process. This provision is necessitated by the fact that the radioactive nature of the derived waste makes placement in the WIPP the best disposition, and the removal of these wastes will, by necessity, take longer than ninety (90) days in accordance with the closure schedules. During this extended period of time, the Permittees will take all steps necessary to prevent threats to human health and the environment, including compliance with all applicable permit requirements. These steps include all of the applicable preparedness and prevention measures in Permit Attachment E.

Finally, in the event the hazardous waste permit is not renewed as assumed in the schedule, the Permittees will submit a modification to the Closure Plan to implement a contingency closure that will allow the Permittees to continue to operate for the disposal of non-mixed TRU waste. This modification will include a request for an extension of the time for final facility closure. This modified Closure Plan will be submitted to the NMED for approval.

I-1d(4) Amendment of the Closure Plan

If it becomes necessary to amend the Closure Plan for the WIPP facility, the Permittees will submit, in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.42), a written notification of or request for a permit modification describing any change in operation or facility design that affects the Closure Plan. The written notification or request will include a copy of the amended Closure Plan for approval by the NMED. The Permittees will submit a written notification of or request for a permit modification to authorize a change in the approved plan, if:

- There are changes in operating plans or in the waste management unit facility design that affect the Closure Plan
- There is a change in the expected year of closure
- Unexpected events occur during panel or final facility closure that require modification of the approved Closure Plan
- Changes in State or Federal laws affect the Closure Plan
- Permittees fail to obtain permits for continued operations as discussed above

The Permittees will submit a written request for a permit modification with a copy of the amended Closure Plan at least sixty (60) days prior to the proposed change in facility design or operation or within sixty (60) days of the occurrence of an unexpected event that affects the Closure Plan. If the unexpected event occurs during final closure, the permit modification will be requested within thirty (30) days of the occurrence. If the Secretary of the NMED requests a modification of the Closure Plan, a plan modified in accordance with the request will be submitted within sixty (60) days of notification or within thirty (30) days, if the change in facility condition occurs during final closure.

I-1e Closure Activities

Closure activities include those instituted for panel closure (i.e., closure of filled underground HWDUs), contingency closure (i.e., closure of surface HWMUs and decontamination of other waste handling areas), and final facility closure (i.e., closure of surface HWMUs, D&D of surface facilities and the areas surrounding the WHB, and placement of repository shaft seals). Panel closure systems will be emplaced to separate areas of the facility and to isolate panels. Permit Attachments I1 and I2 provide panel closure system and shaft seal designs. All closure activities will meet the applicable quality assurance (**QA**)/quality control (**QC**) program standards in place at the WIPP facility. Facility monitoring procedures in place during operations will remain in place through final closure, as applicable.

I-1e(1) Panel Closure

Following completion of waste emplacement in each underground HWDU, disposal-side ventilation will be established in the next panel to be used, and the panel containing the waste will be closed. A panel closure system will be emplaced in the panel access drifts, in accordance with the design in Permit Attachment I1 and the schedule in Figure I-2 and Table I-

1. The panel closure system is designed to meet the following requirements that were established by the DOE for the design to comply with 20.4.1.500 NMAC (incorporating 40 CFR §264.601(a)):

- the panel closure system shall limit the migration of VOCs to the compliance point so that compliance is achieved by at least one order of magnitude
- the panel closure system shall consider potential flow of VOCs through the disturbed rock zone (**DRZ**) in addition to flow through closure components
- the panel closure system shall perform its intended functions under loads generated by creep closure of the tunnels
- the panel closure system shall perform its intended function under the conditions of a postulated methane explosion
- the nominal operational life of the closure system is thirty-five (35) years
- the panel closure system for each individual panel shall not require routine maintenance during its operational life
- the panel closure system shall address the most severe ground conditions expected in the waste disposal area
- the design class of the panel closure system shall be IIIb (which means that it is to be built to generally accepted national design and construction standards)
- the design and construction shall follow conventional mining practices
- structural analysis shall use data acquired from the WIPP underground
- materials shall be compatible with their emplacement environment and function
- treatment of surfaces in the closure areas shall be considered in the design
- thermal cracking of concrete shall be addressed
- during construction, a QA/QC program shall be established to verify material properties and construction practices
- construction of the panel closure system shall consider shaft and underground access and services for materials handling

The performance standard for air emissions from the WIPP facility is established in Module IV and Permit Attachment M2. Releases shall be below these limits for the facility to remain in compliance with standards to protect human health and the environment. The following panel closure design has been shown, through analysis, to meet these standards, if emplaced in accordance with the specifications in Permit Attachment I1.

The approved design for the panel closure system calls for a composite panel barrier system consisting of a rigid concrete plug with removal of the DRZ, and an explosion-isolation wall. The design basis for this closure is such that the migration of hazardous waste constituents from closed panels during the operational and closure period would result in concentrations well below health-based standards. The source term used as the design basis included the average concentrations of VOCs from CH waste containers as measured in headspace gases through January 1995. The VOCs are assumed to have been released by diffusion through the container vents and are assumed to be in equilibrium with the air in the panel. Emissions from the closed panel occur at a rate determined by gas generation within the waste and creep closure of the panel.

Figures I-4 and I-5 show a diagram of the panel closure design and installation envelopes. Permit Attachment I1 provides the detailed design and the design analysis for the panel closure system. Although the permit application proposed several panel closure design options, depending on the gas generated by wastes and the age of the mined openings, the NMED and EPA determined that only the most robust design option (D) would be approved. This decision does not prevent the Permittees from continuing to collect data on the behavior of the wastes and mined openings, or proposing a modification to the Closure Plan in the future, using the available data to support a request for reconsideration of one or more of the original design options. If a design different from Option D as defined in Permit Attachment I1 is proposed, the appropriate permit modification will be sought.

I-1e(2) Decontamination and Decommissioning

Decontamination is defined as those activities which are performed to remove contamination from surfaces and equipment that are not intended to be disposed of at the WIPP facility. The policy at the WIPP will be to decontaminate as many areas as possible, consistent with radiation protection policy. Decontamination is part of all closure activities and is a necessary activity in the clean closure of the surface container management units. Decontamination determinations are based upon radiological and hazardous constituent surveys.

Decommissioning is the process of removing equipment, facilities, or surface areas from further use and closing the facility. Decommissioning is part of final facility closure only and will involve the removal of equipment, buildings, closure of the shafts, and establishing active and passive institutional controls for the facility. Passive institutional controls are not included in the Permit.

The objective of D&D activities at the WIPP facility is to return the surface to as close to the preconstruction condition as reasonably possible, while protecting the health and safety of the public and the environment. Major activities required to accomplish this objective include, but are not limited to the following:

1. Review of operational records for historical information on releases
2. Visual examination of surface structures for evidence of spills or releases
3. Performance of site contamination surveys

4. Decontamination, if necessary, of usable equipment, materials, and structures including surface facilities and areas surrounding the WHB.

5. Disposal of equipment/materials that cannot be decontaminated but that meet the treatment, storage, and disposal facility waste acceptance criteria (**TSDF-WAC**) in an underground HWDU

6. Emplacement of final panel closure system

7. Emplacement of shaft seals[3]

8. Regrading the surface to approximately original contours

9. Initiation of active controls

This Closure Plan will be amended prior to the initiation of closure activities to specify the methods to be used.

Health and Safety

Before final closure activities begin, health physics personnel will conduct a hazards survey of the unit(s) being closed. A release of radionuclides could also indicate a release of hazardous constituents. If radionuclides are not detected, sampling for hazardous constituents will still be performed if there is documentation or visible evidence that a spill or release has occurred. The purpose of the hazards survey will be to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. This survey will provide the information necessary for the health physics personnel to identify worker qualifications, personal protective equipment (**PPE**), safety awareness, work permits, exposure control programs, and emergency coordination that will be required to perform closure related activities.

I-1e(2)(a) Determine the Extent of Contamination

The first activities performed as part of decontamination include those needed to determine the extent of any contamination that needs to be removed prior to decommissioning a facility. This includes activities 1 to 3 above and, as can be seen by the schedules in Figures I-3 and I-4 (Items B and C), these surveys are anticipated to take ten (10) months to perform, including obtaining the results of any sample analyses. The process of identifying areas that require decontamination include three sources of information. First, operating records will be reviewed to determine where contamination has previously been found as the result of historical releases and spills. Even though releases and spills will have been cleaned up at the time of occurrence, newer equipment and technology may allow further cleaning. Second, surfaces of facilities and structures will be examined visually for evidence of spills or releases. Finally, extensive detailed contamination surveys will be performed to document the level of cleanliness for all surface structures and equipment. If equipment or areas are identified as contaminated, the Permittees

[3] For the purposes of planning, the conclusion of shaft sealing is used by the DOE as the end of closure activities and the beginning of the Post-Closure Care Period.

will notify NMED as specified in Permit Module I, and a plan and procedure(s) will be developed and implemented to address decontamination-related questions, including:

- Should the component be decontaminated or disposed of as waste?
- What is the most cost-effective method of decontaminating the component?
- Will the decontamination procedures adequately contain the contamination?

Radiological and hazardous constituent surveys will be used in determining the presence of hazardous waste and hazardous waste residues in areas where spills or releases have occurred. Radiological surveys are described in Permit Attachment I3. Once cleanup of the radioactivity has been completed, the surface will be sampled for hazardous constituents specified in Permit Attachment O to determine that they, too, have been cleaned up. Sampling and analysis protocols will be consistent with EPA's document SW-846 (EPA, 1996).

I-1e(2)(b) Decontamination Activities

Once the extent of contamination is known, decontamination activities will be planned and performed. Radiological control and the control of hazardous waste residues are the primary criteria used in the design of decontamination activities. Radiation control procedures require that careful planning and execution be used in decontamination activities to prevent the exposure of workers beyond applicable standards and to prevent the further spread of contamination. Careful control of entry, cleanup, and ventilation are vital components of radiation decontamination. The level of care mandated by DOE orders and occupational protection requirements results in closure activities that will exceed the one hundred eighty (180) days allowed in 20.4.1.500 NMAC (incorporating 40 CFR §264.113(b)). Decontamination activities are included as item 4 above and are shown on the schedules for contingency closure and final facility closure (Figures I-3 and I-4) as activities D, E, and F. These activities are anticipated to have a duration of twenty (20) months for both contingency closure and for final facility closure. The result of these activities is the clean closure of the surface container management units. Under contingency closure, the other areas that have been decontaminated will not be closed. Instead they will remain in use for continued waste management activities involving non-mixed waste. Under final facility closure, other areas that are decontaminated are eligible for closure.

The "Start Clean—Stay Clean" operating philosophy of the WIPP Project will provide for minimum need for decontamination. However, the need for decontamination techniques may arise.

Decontamination activities will be coordinated with closure activities so that areas that have been decontaminated will not be recontaminated. All waste resulting from decontamination activities will be surveyed and analyzed for the presence of radioactive contamination and hazardous constituents specified in Permit Attachment O. The waste will be characterized as hazardous, mixed, or radioactive and will be packaged and handled appropriately. Mixed and radioactive waste will be classified as TRU mixed waste managed in accordance with the applicable Permit requirements. Derived mixed waste collected during decontamination activities that are generated before repository shafts have been sealed will be emplaced in the facility, if appropriate, or will be managed together with decontamination derived waste collected after the underground is closed. This waste will be classified and shipped off site to an appropriate, permitted facility for treatment, if necessary, and for disposal.

Removal of Hazardous Waste Residues

Because of the type of waste management activities that will occur at the WIPP facility, waste residues that may be encountered during the operation of the facility and at closure may include derived waste. Derived wastes result from the management of the waste containers or may be 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 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.

Personnel Decontamination

PPE worn by personnel performing closure activities in areas determined to be contaminated will be disposed of appropriately. Disposable PPE used in such areas will be placed into containers and managed as TRU mixed waste. Non-disposable PPE will be decontaminated, if possible. Non-disposable PPE that cannot be decontaminated will be managed as TRU mixed waste.

In accordance with DOE policy, TRU mixed waste PPE will be considered to be contaminated with all of the hazardous waste constituents contained in the containers that have been managed within the unit being closed. Wastes collected as a result of closure activities and that may be contaminated with radioactive and hazardous constituents will be considered TRU mixed wastes. These wastes will be managed as derived wastes, as described in Permit Attachment M2. Such waste, collected as the result of closure of the WIPP facility, will be disposed of in the final open underground HWDU.

Cleanup Criteria

Radiation decontamination will be less than or equal to the following levels, or to whatever lesser levels that may be established by DOE Order at the time of cleanup:

Contamination Type	Loose[4] / Fixed plus removable
alpha contamination (**"**)	20 dpm/100 cm^2
	500 dpm/100 cm^2
beta-gamma contamination (**$-(**)	200 dpm/100 cm^2
	1000 dpm/100 cm^2

Hazardous waste decontamination will be conducted in accordance with standards in 20.4.1.500 NMAC (incorporating 40 CFR §264) or as incorporated into the Permit.

Final Contamination Sampling and Quality Assurance

Verification samples will be analyzed by an approved laboratory that has been qualified by the DOE according to a written program with strict criteria. The QA requirements of EPA/SW-846,

[4] The unit “dpm” stands for “disintegration per minute” and is the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

"Test Methods for Evaluating Solid Waste" (EPA, 1986), will be met for hazardous constituent sampling and analyses.

Quality Assurance/Quality Control

Because decisions about closure activities may be based, in part, on analyses of samples of potentially contaminated surfaces and media, a program to ensure reliability of analytical data is essential. Data reliability will be ensured by following a QA/QC program that mandates adequate precision and accuracy of laboratory analyses. Field documentation will be used to document the conditions under which each sample is collected. The documented QA/QC program in place at the WIPP facility will meet applicable RCRA QA requirements.

Field blanks and duplicate samples will be collected in the field to determine potential errors introduced in the data from sample collection and handling activities. To determine the potential for cross-contamination, rinsate blanks (consisting of rinsate from decontaminated sampling equipment) will be collected and analyzed. At least one rinsate blank will be collected for every 20 field samples. Duplicate samples will be collected at a frequency of one duplicate sample for every ten field samples. In no case will less than one rinsate blank or duplicate sample be collected for a field-sampling effort. These blank and duplicate samples will be identified and treated as separate samples. Acceptance criteria for QA/QC hazardous constituent sample analyses will adhere to the most recent version of EPA SW-846 or other applicable EPA guidance.

I-1e(2)(c) Dismantling

Final facility closure will include dismantling of structures on the surface and in the underground. These are items 6 and 7 above and are represented as Activity G in the final facility closure schedule in Figure I-4. During dismantling, priority will be given to contaminated structures and equipment that cannot be decontaminated to assure these are properly disposed of in the remaining open underground HWDU in a timely manner. All such facilities and equipment are expected to be removed and disposed of sixteen (16) months after the initiation of closure. Dismantling of the balance of the facility, including those structures and equipment that are not included in the application and are not used for TRU mixed waste management, is anticipated to take an additional sixty-six (66) months. It should be noted that the placement of D&D waste into the final underground HWDU may, by necessity, involve the placement of uncontainerized bulk materials such as concrete components, building framing, structural members, disassembled or partially disassembled equipment, or containerized materials in non-standard waste boxes. Such placement will only occur if it can be shown that it is protective of human health and the environment and all items are described in an amendment to the Closure Plan. Identification of bulk items is not possible at this time since their size and quantity will depend on the extent of non-removable contamination.

I-1e(2)(d) Closure of Open Underground HWDU

The closure of the final underground HWDU is shown by Activity H in Figure I-3. This closure will be consistent with the description in Section I-1e(1) and the design in Permit Attachment I1. Detailed closure schedules for underground HWDUs are given in Figure I-2 and Table I-1.

I-1e(2)(e) Final Facility Closure

Final facility closure includes several activities designed to assure both the short-term isolation of the waste and the long-term integrity of the disposal system. These include the placement of plugs in boreholes that penetrate the salt and the placement of the repository sealing system. In addition, the surface will be returned to as near its original condition as practicable, and will be readied for the construction of markers and monuments that will provide permanent marking of the repository location and contents.

Figure I-6 identifies where ten existing boreholes overlie the proximate area of the repository footprint. Of these identified boreholes in Figure I-6, all but ERDA-9 are terminated hundreds of feet above the repository horizon. Only ERDA-9, which is accounted for in long-term performance modeling, is drilled through the repository horizon, near the WIPP excavations.

To mitigate the potential for migration beyond the repository horizon, the DOE has specified that borehole seals be designed to limit the volume of water that could be introduced to the repository from the overlying water-bearing zones and to limit the volume of contaminated brine released from the repository to the surface or water-bearing zones.

Borehole plugging activities have been underway since the 1970s, from the early days of the development of the WIPP facility. Early in the exploratory phase of the project, a number of boreholes were sunk in Lea and Eddy counties. After the WIPP site was situated in its current location, an evaluation of all vertical penetrations was made by Christensen and Peterson (1981).

As an initial criterion, any borehole that connects a fluid-producing zone with the repository horizon becomes a plugging candidate.

Grout plugging procedures are routinely performed in standard oil-field operations; however, quantitative measurements of plug performance are rarely obtained. The Bell Canyon Test reported by Christensen and Peterson (1981) was a field test demonstration of the use of cementitious plugging materials and modification of existing industrial emplacement techniques to suit repository plugging requirements. Cement emplacement technology was found to be "generally adequate to satisfy repository plugging requirements." Christensen and Peterson (1981) also report "that grouts can be effective in sealing boreholes, if proper care is exercised in matching physical properties of the local rock with grout mixtures. Further, the reduction in fluid flow provided by even limited length plugs is far in excess of that required by bounding safety assessments for the WIPP." The governing regulations for plugging and/or abandonment of boreholes are summarized in Table I-3.

The proposed repository sealing system design will prevent water from entering the repository and will prevent gases or brines from migrating out of the repository. The proposed design includes the following subsystems and associated principal functions:

- Near-surface: to prevent subsidence at and around the shafts

- Rustler Formation: to prevent subsidence at and around the shafts and to ensure compliance with Federal and State of New Mexico groundwater protection requirements

- Salado Formation: to prevent transporting hazardous waste constituents beyond the point of compliance specified in Permit Module V

The repository sealing system will consist of natural and engineered barriers within the WIPP repository that will withstand forces expected to be present because of rock creep, hydraulic pressure, and probable collapses in the repository and will meet the closure requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.601 and §264.111). Permit Attachment I2 presents the final repository sealing system design.

Once shaft sealing is completed, the Permittees will consider closure complete and will provide the NMED with a certification of such within sixty (60) days.

I-1e(2)(f) Final Contouring and Revegetation

In the preparation of its Final Environmental Impact Statement (DOE, 1980), the DOE committed to restore the site to as near to its original condition as is practicable. This involves removal of access roads, unneeded utilities, fences, and any other structures built by the DOE to support WIPP operations. Provisions would be left for active post-closure controls of the site and for the installation of long-term markers and monuments for the purpose of permanently marking the location of the repository and waste. Permit Attachment J-1a(1) discusses the active and long-term controls proposed for the WIPP. Installation of borehole seals are anticipated to take twelve (12) months, shaft seals fifty-two (52) months, and final surface contouring eight (8) months.

I-1e(2)(g) Closure, Monuments, and Records

A record of the WIPP Project shall be listed in the public domain in accordance with the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.116). Active access controls will be employed for at least the first one hundred (100) years after final facility closure. In addition, a passive control system consisting of monuments or markers will be erected at the site to inform future generations of the location of the WIPP repository (see "Permanent Marker Conceptual Design Report" [DOE, 1995b]).

This Permit requires only a thirty (30) year post-closure period. This is the maximum post-closure time frame allowed in an initial Permit for any facility, as specified in 20.4.1.500 NMAC (incorporating 40 CFR §264.117(a)). The Secretary of the NMED may shorten or extend the post-closure care period at any time in the future prior to completion of the original post-closure period (30 years after the completion of construction of the shaft seals). The Permanent Marker Conceptual Design Report and other provisions during the first 100 years after closure are addressed under another Federal regulatory program.

Closure of the WIPP facility will contribute to the following:

- Prevention of the intrusion of fluids into the repository by sealing the shafts

- Prevention of human intrusion after closure
- Minimization of future physical and environmental surveillance

Detailed records shall be filed with local, State, and Federal government agencies to ensure that the location of the WIPP facility is easily determined and that appropriate notifications and restrictions are given to anyone who applies to drill in the area. This information, together with land survey data, will be on record with the U.S. Geological Survey and other agencies. The Federal government will maintain permanent administrative authority over those aspects of land management assigned by law. Details of post-closure activities are in Permit Attachment J.

I-1e(3) Performance of the Closed Facility

20.4.1.500 NMAC (incorporating 40 CFR §264.601) requires that a miscellaneous unit be closed in a manner that protects human health and the environment. The RCRA Part B permit application addressed the expected performance of the closed facility during the thirty (30) year post closure period. Groundwater monitoring will provide information on the performance of the closed facility during the post-closure care period, as specified in Section J-1a(2) (Monitoring) of Permit Attachment J.

The principal barriers to the movement of hazardous constituents from the facility or the movement of waters into the facility are the halite of the Salado Formation (natural barrier) and the repository seals (engineered barrier). Data and calculations that support this discussion were presented in the permit application. The majority of the calculations performed for the repository are focused on long-term performance and making predictions of performance over 10,000 years. In the short term, the repository is reaching a steady state configuration where the hypothetical brine inflow rate is affected by the increasing pressure in the repository due to gas generation and creep closure. These three phenomena are related in the numerical modeling performed to support the permit application. The modeling parameters, assumptions and methodology were described in detail in the permit application.

I-2 Notices Required for Disposal Facilities

I-2a Certification of Closure

Within sixty (60) days after completion of closure activities for a HWMU (i.e., for each storage unit and each disposal unit), the Permittees will submit to the Secretary of the NMED a certification that the unit (and, after completion of final closure, the facility) has been closed in accordance with the specifications of this Closure Plan. The certification will be signed by the Permittees and by an independent New Mexico registered professional engineer. Documentation supporting the independent registered engineer's certification will be furnished to the Secretary of the NMED with the certification.

I-2b Survey Plat

Within sixty (60) days of completion of closure activities for each underground HWDU, and no later than the submission of the certification of closure of each underground HWDU, the Permittees will submit to the Secretary of the NMED a survey plat indicating the location and dimensions of hazardous waste disposal units with respect to permanently surveyed benchmarks. The plat will be prepared and certified by a professional land surveyor and will contain a prominently displayed note that states the Permittees' obligation to restrict disturbance of the hazardous waste disposal unit. In addition, the land records in the Eddy County Courthouse, Carlsbad, New Mexico, will be updated through filing of the final survey plats.

References

Christensen, C. L., and Peterson, E. W. 1981. "Field-Test Programs of Borehole Plugs in Southeastern New Mexico." In The *Technology of High-Level Nuclear Waste Disposal Advances in the Science and Engineering of the Management of High-Level Nuclear Wastes*, P. L. Hofman and J. J. Breslin, eds., SAND79-1634C, DOE/TIC-4621, Vol. 1, pp. 354–369. Technical Information Center of the U.S. Department of Energy, Oak Ridge, TN.

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U.S. Department of Energy, 1980, "Final Environmental Impact Statement, Waste Isolation Pilot Plant," DOE/EIS 0026, U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy, 1995b, "Permanent Marker Conceptual Design Report," from Appendix PMR of the *Draft Compliance Certification Application*, Draft-DOE/CAO-2056, U.S. Department of Energy, Carlsbad, NM.

U.S. Department of Energy, 1997, "WIPP Safety Analysis Report," DOE/WIPP-95-2065, Revision 1, U.S. Department of Energy, Carlsbad, NM.

U.S. Environmental Protection Agency, 1996, "Test Methods for Evaluating Solid Waste," SW-846, U.S. Environmental Protection Agency, Washington, D.C.

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1 **TABLES**

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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	11/06	12/06	6/07
PANEL 4	11/06	6/08	7/08	1/09
PANEL 5	6/08	11/09	12/09	6/10
PANEL 6	11/09	2/11	3/11	9/11
PANEL 7	2/11	6/12	7/12	1/13
PANEL 8	6/12	1/14	2/14	8/14
PANEL 9	1/14	1/28	2/28	SEE NOTE 4
PANEL 10	1/28	9/30	10/30	SEE NOTE 4

NOTE 1: Only Panels 1 to 5 will be closed under the initial term of this permit. Closure schedules for Panels 6 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 five years after completion of their respective explosion isolation wall.

TABLE I-2
ANTICIPATED OVERALL SCHEDULE FOR CLOSURE ACTIVITIES

ACTIVITY	FINAL FACILITY CLOSURE	
	START	STOP
Notify NMED of Intent to Close WIPP (or to Implement Contingency Closure)	October 2030	N/A
Perform Contamination Surveys in both Surface Storage Areas	October 2030	April 2031
Sample Analysis	December 2030	July 2031
Decontamination as Necessary of both Surface Storage Areas	June 2031	January 2032
Final Contamination Surveys of both Surface Storage Areas	February 2032	September 2032
Sample Analysis	June 2032	January 2033
Prepare and Submit Container Management Unit Closure Certification	February 2033	May 2033
Dispose of Closure-Derived Waste	November 2030	January 2032
Closure of Open Underground HWDU panel	February 2032*	September 2032
Install Borehole Seals	October 2032	September 2033
Install Repository Seals	June 2033	September 2037
Recontour and Revegetate	October 2037	May 2038
Prepare and Submit Final (Contingency) Closure Certification	October 2037	May 2038
Post-closure Monitoring	July 2038	N/A

N/A--Not Applicable
Refer to Figures I-3 and I-4 for precise activity titles.

*This assumes the final waste is placed in this unit in January 2032 and notification of closure for this HWDU is submitted to the NMED in December 2031.

TABLE I-3
GOVERNING REGULATIONS FOR BOREHOLE ABANDONMENT

Federal or State Land	Type of Well or Borehole	Governing Regulation	Summary of Requirements
Both	Groundwater Surveillance	State and Federal regulation in effect at time of abandonment	Monitor wells no longer in use shall be plugged in such a manner as to preclude migration of surface runoff or groundwater along the length of the well. Where possible, this shall be accomplished by removing the well casing and pumping expanding cement from the bottom to the top of the well. If the casing cannot be removed, the casing shall be ripped or perforated along its entire length if possible, and grouted. Filling with bentonite pellets from the bottom to the top is an acceptable alternative to pressure grouting.
Federal	Oil and Gas Wells	43 CFR Part 3160, §§ 3162.3-4	The operator shall promptly plug and abandon, in accordance with a plan first approved in writing or prescribed by the authorized officer.
Federal	Potash	43 CFR Part 3590, § 3593.1	(b) Surface boreholes for development or holes for prospecting shall be abandoned to the satisfaction of the authorizing officer by cementing and/or casing or by other methods approved in advance by the authorized officer. The holes shall also be abandoned in a manner to protect the surface and not endanger any present or future underground operation, any deposit of oil, gas, or other mineral substances, or any aquifer.
State	Oil and Gas Well Outside the Oil-Potash Area	State of New Mexico, Oil Conservation Division, Rule 202 (eff. 3-1-91)	B. Plugging (1) Prior to abandonment, the well shall be plugged in a manner to permanently confine all oil, gas, and water in the separate strata where they were originally found. This can be accomplished by using mud-laden fluid, cement, and plugs singly or in combination as approved by the Division on the notice of intention to plug. (2) The exact location of plugged and abandoned wells shall be marked by the operator with a steel marker not less than four inches (4") in diameter, set in cement, and extending at least four feet (4') above mean ground level. The metal of the marker shall be permanently engraved, welded, or stamped with the operator name, lease name, and well number and location, including unit letter, section, township, and range.
State	Oil and Gas Wells Inside the Oil-Potash Area	State of New Mexico, Oil Conservation Division, Order No. R-111-P (eff. 4-21-88)	F. Plugging and Abandonment of Wells (1) All existing and future wells that are drilled within the potash area, shall be plugged in accordance with the general rules established by the Division. A solid cement plug shall be provided through the salt section and any water-bearing horizon to prevent liquids or gases from entering the hole above or below the salt selection. It shall have suitable proportions—but no greater than three (3) percent of calcium chloride by weight—of cement considered to be the desired mixture when possible.

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FIGURES

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Figure I-1
Location of Underground HWDUs and Anticipated Closure Locations

Figure I-2
WIPP Panel Closure Schedule

Figure I-3
WIPP Facility Final Closure Schedule

Figure I-4
Design of a Panel Closure System

Figure I-5
Typical Disposal Panel

Figure I-6
Approximate Location of Boreholes in Relation to the WIPP Underground

ATTACHMENT J1

ACTIVE INSTITUTIONAL CONTROLS DURING POST-CLOSURE

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ATTACHMENT J1

ACTIVE INSTITUTIONAL CONTROLS DURING POST-CLOSURE

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ACRONYMS

CH	contact-handled
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LWA	Land Withdrawal Act
SWB	standard waste box
TRU	transuranic
WIPP	Waste Isolation Pilot Plant

ATTACHMENT J1

ACTIVE INSTITUTIONAL CONTROLS DURING POST-CLOSURE

Introduction

Under the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.118(b), the following activities identified as active institutional controls during post-closure are incorporated into the Post-Closure Plan.

The post-closure requirements of this permit include 20.4.1.500 NMAC, incorporating:

- 40 CFR §264.117(a)(1), which requires that

"Post-closure care for each hazardous waste management unit subject to the requirements of §264.117 through 264.120 must begin after completion of closure of the unit and continue for 30 years after that date..."

- 40 CFR §264.601, which requires that

"A miscellaneous unit must be...maintained and closed in a manner that will ensure protection of human health and the environment..."

- and 40 CFR §264.603, which requires that

"A miscellaneous unit that is a disposal unit must be maintained in a manner that complies with §264.601 during the post-closure care period."

The containment requirements for a disposal system for transuranic (**TRU**) radioactive wastes are defined in Title 40 CFR §191.13 (U.S. Environmental Protection Agency [**EPA**] 1993). 40 CFR §191.14 is titled Assurance Requirements. With regard to the active institutional controls aspect of Assurance Requirements, 40 CFR §191.14 states the following:

"To provide the confidence needed for long-term compliance with the requirements of §191.13, disposal of spent fuel or high-level or transuranic wastes shall be conducted in accordance with the following provisions... (a) Active institutional controls over disposal sites should be maintained for as long a period of time as is practicable after disposal; however, performance assessments that assess isolation of the wastes from the accessible environment shall not consider any contribution from active institutional controls for more than 100 years after disposal... "

40 CFR §191.12 states the following:

"Active institutional controls mean:
1) controlling access to a disposal site by any means other than passive institutional controls,

2) performing maintenance operations or remedial actions at a site,
3) controlling or cleaning up releases from a site, or
4) monitoring parameters related to disposal system performance."

Purpose: This Permit Attachment describes the design of a system that the Permittees will implement for compliance with the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.118(b)) and 40 CFR §191.14(a) to control access to the Waste Isolation Pilot Plant (**WIPP**) disposal site and implement maintenance and remedial actions pertaining to the site access controls. In addition, this Permit Attachment addresses the scheduling process for control of inspection, maintenance, and periodic reporting related to long-term monitoring. Long-term monitoring addresses the monitoring of disposal system performance, as required by 40 CFR §191.14(b), and environmental monitoring, in accordance with this Permit and the Consultation and Cooperation Agreement between the U.S. Department of Energy (**DOE**) and the state of New Mexico. The scheduling process will also address evaluation of testing activities related to the permanent marker system design contained within the passive institutional controls (not required by this permit).

Implementation of active institutional controls at the WIPP will commence when final facility closure is achieved, as specified in Module II and Permit Attachment I. Implementation of active institutional controls marks the transition from the active life of the facility (which ends upon certification of closure) to the post-closure care period, as specified in 20.4.1.500 NMAC (incorporating 40 CFR §264 Subpart G). The Permittees will continue the imposition of active institutional controls under this Permit until NMED approves the post-closure certification specified in Module VI and Permit Attachment J.

Decommissioning activities include decontamination and site restoration. The decontamination effort will be completed prior to sealing of the shafts to allow disposal of all derived waste (radioactive and/or mixed waste derived from TRU/TRU-mixed waste received at the WIPP) into the repository. The implementation of active institutional controls upon certification of facility closure will prevent human intrusion into the repository. The Permittees' restoration efforts will return the land disturbed by the WIPP activities to a stable ecological state that will assimilate with the surrounding undisturbed ecosystem. Necessary exceptions to returning the site to its full pre-WIPP condition include measurements associated with long-term monitoring.

Scope: The active institutional control requirements include a means of controlling access to the site of the repository's surface footprint (the repository area projected to the surface) and maintenance, including corrective actions, for access control system components. Active control of access to the site will be exercised by the Permittees for the duration of the post-closure care period. Although the Permittees are only required to maintain active institutional controls until approval of the post-closure certification by NMED, the Permittees will continue active institutional controls for at least one hundred (100) years after final facility closure to satisfy other regulatory requirements. Control of access will prevent intrusion into the disposed waste by deep drilling or mining for natural resources. This Permit Attachment also specifies a process for scheduling activities related to the long-term monitoring of the repository. Some of the activities supporting the monitoring programs will be initiated during the active life of the facility to establish databases. These activities are planned to continue beyond closure through the time after removal of the site structures and return of the land disturbed by the WIPP activities to a stable ecological state that will assimilate with the surrounding undisturbed ecosystem. Long-term monitoring requirements will be necessarily integrated with efforts toward returning the land to a stable ecological state.

Background: The WIPP was sited and designed as a research and development facility to demonstrate the safe disposal of radioactive wastes. The wastes are derived from DOE defense-related activities. Specifically, the mission of the WIPP project is to conduct research, demonstration, and siting studies relevant to the permanent disposal of TRU wastes. Most of these wastes will be contaminated with hazardous constituents, making them mixed wastes.

The LWA addresses the disposal phase of the WIPP project, the period following closure of the site, and the removal of the surface facilities. The LWA set aside 10,240 acres (4,144 hectares) located in Eddy County, 26 miles (42 kilometers) east of Carlsbad, New Mexico, as the WIPP site. A 277-acre (112-hectare) portion within the 10,240 acres (4,144 hectares) is bounded by a barbed wire fence. This fenced area contains the surface facilities and the mined salt piles for the WIPP site. Figure J1-1 is a cutaway illustrating the spatial relationship of the surface facilities and the underground repository.

Upon receipt of the necessary certifications and permits from the EPA and the New Mexico Environment Department, the Permittees will begin disposal of contact-handled (**CH**) and remote-handled (**RH**) TRU and TRU mixed waste in the WIPP. This waste emplacement and disposal phase will continue until the regulated capacity of the repository of 6,200,000 cubic feet (175,588 cubic meters) of TRU and TRU mixed waste has been reached, and as long as the Permittees comply with the requirements of the Permit. For the purposes of this Permit Attachment, this time period is assumed to be 25 years. The waste will be shipped from ~~10~~ DOE facilities across the country in specially designed transportation containers certified by the Nuclear Regulatory Commission. The transportation routes from these facilities to the WIPP have been predetermined. The CH TRU mixed waste will be packaged in 55-gallon (208-liter), 85-gallon (320-liter), 100-gallon (379-liter) steel drums, standard waste boxes (**SWBs**), and/or ten drum overpacks (**TDOPs**). An SWB is a steel container having a free volume of approximately 65 cubic feet (1.8 cubic meters). Figure J1-2 shows the general arrangement of a seven-pack of drums and an SWB as received in a Contact-Handled Package. RH TRU mixed waste inside a Remote-Handled Package is contained in one or more of the allowable containers described in Permit Attachment M1.

Upon receipt and inspection of the waste containers in the waste handling building, the containers will be moved into the repository 2,150 feet (655 meters) below the surface. The containers will then be transported to a disposal room. (See Figure J1-1 for room and panel arrangement.) The initial seven disposal rooms are in Panel 1. Panel 1 is the first of eight panels planned to be excavated. Special supports and ground control corrective actions have been implemented in Panel 1 to ensure its stability. Upon filling an entire panel, that panel will be closed to isolate it from the rest of the repository and the ventilation system. During the period of time it takes to fill a given panel, an additional panel will be excavated. Sequential excavation of Panels 2 through 8 will ensure that these individual panels remain stable during the entire time a panel is being filled with waste. Ground control maintenance and evaluation with appropriate corrective action will be required to ensure that Panels 9 and 10 (ventilation and access drifts in the repository) remain stable.

Decontamination of the WIPP facility will commence with a detailed radiation survey of the entire site. Contaminated areas and equipment will be evaluated and decontaminated in accordance with applicable requirements. Where decontamination efforts identify areas that meet clean closure standards for permitted container storage units and are below radiological release criteria, routine dismantling and salvaging practices will determine the disposition of the material or equipment involved. Material and equipment that do not meet these standards and criteria will be emplaced in the access entries (Panels 9 and/or 10). Upon completion of emplacement of the contaminated facility material, the entries will be closed and the repository shafts will be sealed. Final repository closure includes sealing the shafts leading to the repository. Figure J1-3 illustrates the shaft sealing arrangement. Certification of closure will end disposal operations and initiate the post-closure care period for implementation of active institutional controls.

J1.1 Active Institutional Controls

Active institutional controls during post-closure consist of three elements:

- controlling access to a disposal site,
- performing maintenance operations or remedial actions at a site, and
- controlling or cleaning up releases from a site.

The LWA has removed the WIPP site from public use as a site for mining and other types of mineral resource extraction. Since any type of exploration activity would require authorization, the issuance of approval to intrude upon the repository is precluded by the LWA. The existence of the LWA as law permits meeting the requirements of the first element above by implementing low technology barriers. These barriers include a posted fence and active surveillance at a frequency that denies sufficient time for an individual or organization to intrude into the repository undetected using today’s drilling technology. Maintenance and remedial actions at the WIPP site will be conducted by the Permittees at the time of implementing the access controls for the site. The control or cleanup of releases from the site will be conducted as part of the operational program prior to sealing of the shafts. This is necessary to ensure that all derived waste is disposed of within the repository prior to shaft sealing.

The Permittees shall maintain the access controls. This requirement includes the maintenance and corrective actions necessary to ensure that the fence and patrol requirements (surveillance) are met. The active institutional controls to be implemented by the Permittees after final closure are the following:

1. A fence line will be established to control access to the repository footprint area on the surface. A standard four-strand (three barbed and one unbarbed, in accordance with the Bureau of Land Management specifications) wire fence will be erected along the perimeter of the repository surface footprint. To provide access to the repository footprint during construction of the berm (which may be built in multiple sections simultaneously), the fence will have gates placed approximately midway along each of the four sides. these gates will remain locked with access controlled by the Permittees. The western gate will be 20 feet

(6 meters) wide. The remaining three gates will each be 16 feet (4.9 meters) wide. Additional fencing will be constructed where appropriate for remote locations that are used for disposal system monitoring. Such fences will meet the same construction specifications as the repository footprint perimeter fence.

2. Unpaved roadways 16 feet (4.9 meters) wide will be established along the perimeter of the barbed wire fence as well as along the WIPP site boundary. These roadways will be constructed so as to provide ready vehicle access to any point around the fenced perimeter and the site boundary. These roadways will facilitate inspection and maintenance of the fenceline and will allow visual observation of the repository footprint and the site boundary to the extent permitted by the lay of the land. These roadways will connect to the paved south access road. Roads to remote sites will also be constructed and maintained where appropriate.

3. The fence line will be posted with signs having, as a minimum, a legend reading "Danger—Unauthorized Personnel Keep Out" (20.4.1.500 NMAC (incorporating 40 CFR §264.14[c])) and warning against entering the area without specific permission of the Permittees. The legend must be written in English and Spanish. The signs must be legible from a distance of at least 25 feet (7.6 meters). The size of the visual warning and the spacing of the warning signs will be sufficiently large and close to ensure that one or more of the signs can be seen from any approach prior to an individual actually making contact with the fence line. In no case will the spacing be greater than 300 feet (91.5 meters).

4. The Permittees will ensure that periodic inspection and expedited corrective maintenance are conducted on the fence line, its associated warning signs, and roadways.

5. The Permittees will provide for routine periodic patrols and surveillance of all areas controlled by or under the authority of the Permittees by personnel trained in security surveillance and investigation.

6. The Permittees will implement the periodic monitoring requirements of the long-term monitoring system.

7. The Permittees will submit a Permit modification request for any proposed modifications to the active institutional controls appropriate for access control, as specified in 20.4.1.900 NMAC (incorporating 40 CFR 270.42).

8. The Permittees will immediately take appropriate action to address abnormal conditions identified during periodic surveillance and inspections. Abnormal conditions include any natural or human-caused conditions which would affect the integrity of the active institutional controls.

9. Reports addressing activities associated with the performance of the active access controls after final closure will be prepared periodically according to

applicable requirements by the Permittees for submittal to the appropriate regulatory and legislative authorities.

J1.1.1 Repository Footprint Fencing

Access to an area approximately 2,780 feet by 2,360 feet (875 meters by 720 meters) will be controlled by a four-strand barbed wire fence. A single gate will be included along each side of the fence for access. These gates will remain locked with access controlled by the Permittees. Around the perimeter of the fence, an unpaved roadway 16 feet (4.9 meters) wide will be cut to allow for patrolling of the perimeter. Figure J1-4 is an illustration of the fence line in relation to the repository footprint. Patrolling of the perimeter is based upon the need to ensure that no mining or well drilling activity is initiated that could threaten the integrity of the repository.

Fencing off an area larger than the disposal area footprint would not significantly reduce the risk of intrusion but would interfere with cattle grazing established prior to the LWA. The LWA states that the Secretary of Energy can allow grazing to continue where it was established prior to enactment of the LWA. Based upon current drilling technologies, discussions with local well drilling organizations, and observation of well drilling activities in the WIPP vicinity, it typically requires at least two to three days for a driller to set up a deep drilling rig and commence actual drilling operations. Attaining the 2,150-foot (655-meter) depth that would approach the repository horizon takes at least another week to 10 days. Based upon current drilling practices, patrolling the fenced area two to three times weekly would identify any potential drilling activity well before any breach of the repository could occur. Therefore, the perimeter fence will be patrolled three times weekly after final closure.

Construction of access control systems using higher technology than described is not required. Likewise, continuous surveillance whether human or electronic is not required.

J1.1.2 Surveillance Monitoring

The Permittees will conduct periodic surveillance of the site and the repository footprint during the post-closure period. Unpaved roadways around the WIPP site boundary and around the repository footprint will facilitate such surveillance. Contractual arrangements with a local organization such as the Eddy County Sheriff's Department may be established which would provide some distinct advantages. Among the advantages are the following:

- deputies are trained in patrol and surveillance activities,
- deputies are authorized to arrest members of the general public who are found to be violating trespassing laws,
- the liability associated with apprehension, attempted apprehension, or circumstances arising from attempts would remain with the Sheriff's Department, and
- the general area to be patrolled is already a part of the Sheriff's area of responsibility.

Surveillance will consist of drive-by patrolling around the fenced perimeter a minimum of three times per week. In the course of the patrol, particular note will be taken of the fence integrity. In addition, the locked condition of each gate will be checked to ensure that gate integrity is maintained and there is no evidence of tampering. Surveillance will also include visual observation of the entire enclosed area for any signs of human activity. Additionally, surveillance patrols will be conducted around the site boundary's perimeter for signs of unauthorized human activities. A routine summary of each month's surveillance activity will be prepared documenting the date and time of each patrol and any unusual circumstances that may have been observed. This surveillance routine will continue throughout the post-closure care period.

J1.1.3 Maintenance and Remedial Actions

Anticipated maintenance and remedial action issues during the post-closure care period are minimal and should encompass such issues as

- fence and road maintenance,
- repair of any damage that occurs,
- response to evidence of potential erection of drilling equipment, and
- response to unauthorized entry into prohibited areas.

The Permittees will provide maintenance services within a reasonable time after the need is identified during routine patrolling activity. Any observed vandalism or unauthorized entry will be investigated and action will be taken as the circumstances warrant.

J1.1.4 Control and Clean-up of Releases

The decontamination process and disposal of the derived waste will be completed prior to sealing the shafts and final facility closure. With the location of the WIPP repository at 2,150 feet (655 meters) below the surface and with panels closed and shafts sealed, the potential for releases of radioactive material or hazardous constituents following the sealing of the shafts is precluded. There will be no credible pathway for releases from the repository other than human intrusion. Routine patrols in accordance with access control requirements will preclude human intrusion into the repository during the post-closure period.

J1.1.5 Groundwater Monitoring

Groundwater monitoring is the only monitoring program required by the Permit that will be conducted throughout the post-closure care period. The post-closure groundwater monitoring requirements are specified in Permit Module VI and Permit Attachment L.

J1.2 Additional Post-Closure Activities

With the certification of closure of WIPP and return of the land disturbed by the WIPP activities to a stable ecological state that will assimilate with the surrounding undisturbed ecosystem, continuous occupancy of the site for operational and security purposes will cease. Any additional activities will be imposed through the Post-Closure Care Permit issued by NMED after certification of closure.

J1.3 Quality Assurance

The quality assurance and quality control plan will be applied to the procurement of materials for and the erection of the fencelines enclosing the repository footprint. In particular, quality control inspection of the placement and tensioning of the barbed wire and chain link fabric will be applied and utilized to provide reasonable assurance that the fencing structures will function during the post-closure care period with normal maintenance.

Quality assurance and quality control will also be applied to the sampling and analyses supporting the environmental monitoring program. Contractors collecting samples and laboratories conducting analyses for the Permittees shall be qualified in accordance with guidelines prescribed in the most current edition of the Permittees' quality assurance program document at the time that the contracts are awarded.

References

EPA (U.S. Environmental Protection Agency). 1993. 40 CFR Part 191 Environmental Radiation Protection Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Waste; Final Rule. *Federal Register*, Vol. 58, No. 242, pp. 66398-66416, December 20, 1993. Office of Radiation and Indoor Air, Washington, D.C.

U.S. Congress. 1992. Waste Isolation Pilot Plant Land Withdrawal Act. Public Law 102-579, 106 Stat. 4777, October 1992. 102nd Congress, Washington, D.C.

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FIGURES

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Figure J1-1
Spatial View of WIPP Surface and Underground Facilities

Figure J1-2
Standard Waste Box and Seven-Pack Configuration

Figure J1-3
Typical Shaft Sealing System

Figure J1-4
Perimeter Fenceline and Roadway

PERMIT ATTACHMENT M

INFORMATION FOR SPECIFIC UNITS

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PERMIT ATTACHMENT M

INFORMATION FOR SPECIFIC UNITS

Introduction

Management, storage and disposal of transuranic (**TRU**) mixed waste in the Waste Isolation Pilot Plant (**WIPP**) facility is subject to regulation under Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1 (20.4.1 NMAC), Subpart V.

Module III of the permit authorizes the storage and management of contact-handled (**CH**) and remote-handled (**RH**) TRU mixed waste containers in the Waste Handling Building Container Storage Unit (**WHB Unit**) and Parking Area Container Storage Units (**Parking Area Unit**). The technical requirements of 20.4.1.500 NMAC (incorporating 40 CFR §§264.170 to 264.178) are applied to the operation of the ~~Waste Handling Building Container Storage~~ WHB Unit ~~(**WHB Unit**),~~ and the Parking Area ~~Container Storage~~ Unit ~~(**Parking Area Unit**)~~. Permit Attachment M1 describes the container storage units, the TRU mixed waste management facilities and operations, and compliance with the technical requirements of 20.4.1.500 NMAC.

The WIPP is a geologic repository mined within a bedded salt formation, which is defined in 20.4.1.100 NMAC (incorporating 40 CFR §260.10) as a miscellaneous unit. As such, hazardous waste management units (**HWMUs**) within the repository are eligible for permitting according to 20.4.1.101 NMAC (incorporating 40 CFR §260.10), and are regulated under 20.4.1.500 NMAC, Miscellaneous Units.

Module IV of the permit authorizes the management and disposal of CH and RH TRU mixed waste containers in panels, also referred to as underground Hazardous Waste Disposal Units (**HWDUs**). The Disposal Phase will consist of receiving CH and RH TRU mixed waste shipping containers, unloading and transporting the waste containers to the Underground HWDUs, emplacing the waste in the Underground HWDUs, and subsequently achieving closure of the Underground HWDUs in compliance with applicable State and Federal regulations. As required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601), the Permittees shall ensure that the environmental performance standards for a miscellaneous unit, which are applied to the Underground HWDUs in the geologic repository, will be met. Permit Attachment M2 describes the HWDUs, the TRU mixed waste management facilities and operations, and compliance with the technical requirements of 20.4.1.500 NMAC.

PERMIT ATTACHMENT M1

CONTAINER STORAGE

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PERMIT ATTACHMENT M1

CONTAINER STORAGE

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PERMIT ATTACHMENT M1

CONTAINER STORAGE

Introduction

Management and storage of transuranic (**TRU**) mixed waste in the Waste Isolation Pilot Plant (**WIPP**) facility is subject to regulation under Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1 (20.4.1 NMAC), Subpart V. The technical requirements of 20.4.1.500 NMAC (incorporating 40 CFR §§264.170 to 264.178 are applied to the operation of the Waste Handling Building Container Storage Unit (**WHB Unit**)(Figure M1-1), and the Parking Area Container Storage Unit (**Parking Area Unit**)(Figure M1-2). This Permit Attachment describes the container storage units, the TRU mixed waste management facilities and operations, and compliance with the technical requirements of 20.4.1 NMAC. The configuration of the WIPP facility consists of completed structures, including all buildings and systems for the operation of the facility.

M1-1 Container Storage

The waste containers that will be used at the WIPP facility qualify as "containers," in accordance with 20.4.1.101 NMAC (incorporating 40 CFR §260.10). That is, they are "portable devices in which a material is stored, transported, treated, disposed of, or otherwise handled."

M1-1a Containers with Residual Liquids

The Permit Treatment, Storage, and Disposal Facility (**TSDF**) Waste Acceptance Criteria (**WAC**) and the Waste Analysis Plan (Permit Attachment B) prohibit the shipment of liquid waste to the WIPP. This prohibition is enforced as a maximum residual liquids requirement. In no case shall the total liquid equal or exceed one volume percent of the waste container (e.g., drum, ~~or~~ standard waste box [**SWB**], or canister). Since the maximum amount of liquid is one percent, calculations made to determine the secondary containment as required by 20.4.1.500 NMAC (incorporating §264.175) are based on ten percent of one percent of the volume of the containers, or one percent of the largest container, whichever is greater.

M1-1b Description of Containers

20.4.1.500 NMAC (incorporating 40 CFR §264.171) requires that containers holding waste be in good condition. Waste containers shall be in good condition prior to shipment from the generator sites, i.e., containers will be of high integrity, intact, and free of surface contamination above DOE limits. The Manager of the DOE Carlsbad Field Office has the authority to suspend a generator's certification to ship TRU mixed waste to the WIPP facility should the generator fail to meet this requirement. The containers will be certified free of surface contamination above DOE limits upon shipment. This condition shall be verified upon receipt of the waste at WIPP. The level of rigor applied in these areas to ensure container integrity and the absence of external contamination on both ends of the transportation process will ensure that waste containers entering the waste management process line at WIPP meet the applicable Resource Conservation and Recovery Act (**RCRA**) requirements for container condition.

M1-1b(1) CH TRU Mixed Waste Containers

Contact handled (**CH**) TRU mixed waste containers will be either 55-gal (208-L) drums singly or arranged into 7-packs, 85-gal (321-L) drums singly or arranged into 4-packs, 100-gal (379 L) drums singly or arranged into 3-packs, ten-drum overpacks (**TDOP**), or SWBs. A summary description of each CH TRU mixed waste container type is provided below.

Standard 55-Gallon Drums

Standard 55-gal (208-L) drums meet the requirements for U.S. Department of Transportation (**DOT**) specification 7A regulations.

A standard 55-gal (208-L) drum has a gross internal volume of 7.4 cubic feet (ft^3) (0.210 cubic meters (m^3)). Figure M1-3 shows a standard TRU mixed waste drum. One or more filtered vents (as described in Section M1-1d(1)) will be installed in the drum lid to prevent the escape of any radioactive particulates and to eliminate any potential of pressurization.

Standard 55-gal (208-L) drums are constructed of mild steel and may also contain rigid, molded polyethylene (or other compatible material) liners. These liners are procured to a specification describing the functional requirements of fitting inside the drum, material thickness and tolerances, and quality controls and required testing. A quality assurance surveillance program is applied to all procurements to verify that the liners meet the specification.

Standard 55-gal (208-L) drums may be used to collect derived waste.

Standard Waste Boxes

The SWBs meet all the requirements of DOT specification 7A regulations.

One or more filtered vents (as described in Section M1-1d(1)) will be installed in the SWB body and located near the top of the SWB to prevent the escape of any radioactive particulates and to eliminate any potential of pressurization. They have an internal volume of 66.3 ft^3 (1.88 m^3). Figure M1-4 shows a SWB.

The SWB is the largest container that may be used to collect derived waste.

Ten-Drum Overpack

The TDOP is a metal container, similar to a SWB, that meets DOT specification 7A and is certified to be noncombustible and to meet all applicable requirements for Type A packaging. The TDOP is a welded-steel, right circular cylinder, approximately 74 inches (in.) (1.9 meters (m)) high and 71 in. (1.8 m) in diameter (Figure M1-5). The maximum loaded weight of a TDOP is 6,700 pounds (lbs) (3,040 kilograms (kg)). A bolted lid on one end is removable; sealing is accomplished by clamping a neoprene gasket between the lid and the body. One or more filter vents are located near the top of the TDOP on the body to prevent the escape of any radioactive particulates and to eliminate any potential of pressurization. A TDOP may contain up to ten standard 55-gal (208-L) drums or one SWB. TDOPs may be used to overpack drums or

SWBs containing CH TRU mixed waste. The TDOP may also be direct loaded with CH TRU mixed waste. Figure M1-5 shows a TDOP.

Eighty-Five Gallon Drum

The 85-gal (321-L) drums meet the requirements for DOT specification 7A regulations. One or more filtered vents (as described in Section M1-1d(1)) will be installed in the 85-gal drum to prevent the escape of any radioactive particulates and to eliminate any potential of pressurization.

85-gal (321-L) drums are constructed of mild steel and may also contain rigid, molded polyethylene (or other compatible material) liners. These liners are procured to a specification describing the functional requirements of fitting inside the drum, material thickness and tolerances, and quality controls and required testing. A quality assurance surveillance program is applied to all procurements to verify that the liners meet the specification.

The 85-gal (321-L) drum, which is shown in Figure M1-6, will be used for overpacking contaminated 55-gal (208 L) drums at the WIPP facility. The 85-gal drum may also be direct loaded with CH TRU mixed waste.

85-gal (321-L) drums may be used to collect derived waste.

100-Gallon Drum

100-gal (379-L) drums meet the requirements for DOT specification 7A regulations.

A 100-gal (379-L) drum has a gross internal volume of 13.4 ft^3 (0.38 m^3). One or more filtered vents (as described in Section M1-1d(1) will be installed in the drum lid or body to prevent the escape of any radioactive particulates and to eliminate any potential of pressurization.

100-gal (379-L) drums are constructed of mild steel and may also contain rigid, molded polyethylene (or other compatible material) liners. These liners are procured to a specification describing the functional requirements of fitting inside the drum, material thickness and tolerances, and quality controls and required testing. A quality assurance surveillance program is applied to all procurements to verify that the liners meet the specification.

100-gal (379-L) drums may be direct loaded.

M1-1b(2) RH TRU Mixed Waste Containers

Remote-Handled (**RH**) TRU mixed waste containers include canisters, which are received at WIPP loaded singly in an RH-TRU 72-B cask, and drums, which are received in a CNS 10-160B cask.

RH TRU Canister

The RH TRU canister is a steel single shell container which is constructed to be of high integrity. An example canister is depicted in Figure M1-16a. The RH TRU canister is vented and will have a nominal internal volume of 31.4 ft^3 (0.89 m^3) and shall contain waste packaged in small containers (e.g., drums) or waste loaded directly into the canister.

RH TRU Facility Canister

The RH TRU Facility Canister is a cylindrical container designed to hold up to three 55-gallon drums (Figure M1-16).

Standard 55-Gallon Drums

Standard 55-gal (208-L) drums meet the requirements for U.S. Department of Transportation (DOT) specification 7A regulations. A detailed description of a standard 55-gallon drum is provided above. Up to ten 55-gallon drums containing RH TRU mixed waste are arranged on two drum carriage units in the CNS 10-160B cask (up to five drums per drum carriage unit). The drums are transferred to an RH TRU mixed waste Facility Canister that will contain up to three drums.

M1-1b(3) Container Compatibility

All containers will be made of steel, and some will contain rigid, molded polyethylene liners. The compatibility study, documented in Appendix C1 of the WIPP RCRA Part B Permit Application (DOE, 1997a), included container materials to assure containers are compatible with the waste. Therefore, these containers meet the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.172).

M1-1c Description of the Container Storage Units

M1-1c(1) Waste Handling Building Container Storage Unit (WHB Unit)

The Waste Handling Building (**WHB**) is the surface facility where TRU mixed waste handling activities will take place (Figure M1-1). The WHB has a total area of approximately 84,000 square feet (ft^2) (7,804 square meters (m^2)) of which ~~33,175~~ 25,650 ft^2 (~~3,082~~ 2,383 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 handling and storage of RH TRU mixed waste, as shown in Figures M1-1 and M1-17a, b and c. ~~This area is~~ These areas are being permitted as the WHB Unit. The concrete floors are sealed with a coating that is sufficiently impervious to the chemicals in TRU mixed waste to meet the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.175(b)(1).

CH TRU Mixed Waste

The Contact-Handled Packages used to transport TRU mixed waste containers will be received through one of three air-lock entries to the CH Bay of the WHB Unit. The WHB heating, ventilation and air conditioning (**HVAC**) system maintains the interior of the WHB at a pressure lower than the ambient atmosphere to ensure that air flows into the WHB, preventing the inadvertent release of any hazardous or radioactive constituents contamination as the result of a contamination event. The doors at each end of the air lock are interlocked to prevent both from opening simultaneously and equalizing CH Bay pressure with outside atmospheric pressure. The CH Bay houses two TRUPACT-II Docks (**TRUDOCKs**), each equipped with overhead cranes for opening and unloading Contact-Handled Packages. The TRUDOCKs are within the TRUDOCK Storage Area of the WHB Unit.

The cranes are rated to lift the Contact-Handled Packaging lids as well as their contents. The cranes are designed to remain on their tracks and hold their load even in the event of a design-basis earthquake.

Upon receipt and removal of CH TRU mixed waste containers from the Contact-Handled Packaging, the waste containers are required to be in good condition as provided in Permit Module III. The waste containers will be visually inspected for physical damage (severe rusting, apparent structural defects, signs of pressurization, etc.) and leakage to ensure they are 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. The Permittees may initiate local decontamination, return unacceptable containers to a DOE generator site or send the Contact-Handled Package to the third party contractor. Decontamination activities will not be conducted on containers which are not in good condition, or which are leaking. If local decontamination activities are opted for, the work will be conducted in the WHB Unit on the TRUDOCK. These processes are described in Section M1-1d. The area previously designated as the Overpack and Repair Room will not be used for TRU mixed waste management in any instances.

Once unloaded from the Contact-Handled Packaging, CH TRU mixed waste containers (7-packs, 3-packs, 4-packs, SWBs, or TDOPs) are placed in one of two positions on the facility pallet or on a containment pallet. The waste containers are stacked, on the facility pallets (one- or two-high, depending on weight considerations). Waste on containment pallets will be stacked one-high. The use of facility or containment pallets will elevate the waste at least 6 in. (15 cm) from the floor surface. Pallets of waste will then be relocated to the ~~Northeast (**NE**)~~ CH Bay Storage Area of the WHB Unit for normal storage. This ~~NE~~ CH Bay Storage Area, which is shown in Figure M1-7, will be clearly marked to indicate the lateral limits of the storage area. This ~~NE~~ CH Bay Storage Area will have a maximum capacity of seventeen pallets (~~1,856~~ 5,440 ft^3 [~~52.6~~ 154 m^3]) of TRU mixed waste containers during normal operations. These pallets will typically be staged in this area for a period of up to five days.

In addition, four Contact-Handled Packages, containing up to eight 7-packs, 3-packs, 4-packs, SWBs, or four TDOPs, may occupy the staging positions at the TRUDOCK Storage Area of the WHB Unit. If waste containers are left in this area, they will be in the Contact-Handled Package with or without the shipping container lids removed. The maximum volume of waste in containers in four Contact-Handled Packages is ~~530.4~~ 640 ft^3 (~~15~~ 18.1 m^3).

The Derived Waste Storage Area of the WHB Unit is on the north wall of the CH Bay. This area will contain containers up to the volume of a SWB for collecting derived waste from all TRU mixed waste handling processes in the WHB Unit. The Derived Waste Storage Area is being permitted to allow containers in size up to a SWB to be used to accumulate derived waste. The volume of TRU mixed waste stored in this area will be up to 66.3 ft^3 (1.88 m^3). The derived waste containers in the Derived Waste Storage Area will be stored on standard drum pallets, which are polyethylene trays with a grated deck, which will elevate the derived waste containers approximately 6 in. (15 cm) from the floor surface, and provide approximately 50 gal (190 L) of secondary containment capacity.

An area has also been designated for the temporary storage of waste containers for which manifest discrepancies were noted after the Contact-Handled Package was opened. Discrepant payloads will be placed either in the Shielded Storage Area of the WHB Unit on a facility pallet or inside a Contact-Handled Package, depending on when the discrepancy is discovered. In either case the waste containers will be elevated approximately six inches from the floor surface. The storage capacity of this area is one pallet load of TRU mixed waste containers (i.e., 4 SWBs, 2 TDOPs, or 28 drums, or combinations of all three).

Aisle space shall be maintained in all WHB Unit TRU mixed waste storage areas. The aisle space shall be adequate to allow unobstructed movement of fire-fighting personnel, spill-control equipment, and decontamination equipment that would be used in the event of an off-normal event. An aisle space of 44 in. (1.1 m) between facility pallets will be maintained in all WHB Unit TRU mixed waste storage areas.

The WHB has been designed to meet DOE design and associated quality assurance requirements. Table M1-1 summarizes basic design requirements, principal codes, and standards for the WIPP facility. Appendix D2 of the WIPP RCRA Part B Permit Application (DOE, 1997a) provided engineering design-basis earthquake and tornado reports. The design-basis earthquake report provides the basis for seismic design of WIPP facility structures, including the WHB foundation. The WIPP design-basis earthquake is 0.1 g. The WIPP design-basis tornado includes a maximum windspeed of 183 mi per hr (mi/hr) (294.5 km/hr), which is the vector sum of all velocity components. It is also limited to a translational velocity of 41 mi/hr (66 km/hr) and a tangential velocity of 124 mi/hr (200 km/hr). Other parameters are a radius of maximum wind of 325 ft (99 m), a pressure drop of 0.5 lb per in.^{2} (3.4 kilopascals [kPa]), and a rate-of-pressure drop of 0.09 lb/in.^{2}/s (0.6 kPa/s). A design-basis flood report is not available because flooding is not a credible phenomenon at the WIPP facility. Design calculations for the probable maximum precipitation (**PMP**) event, provided in Appendix D7 of the WIPP RCRA Part B Permit Application (DOE, 1997a), illustrated run-on protection for the WIPP facility.

The following are the major pieces of equipment that will be used to manage CH TRU mixed waste in the container storage units. A summary of equipment capacities, as required by 20.4.1.500 NMAC is included in Table M1-2.

TRUPACT-II Type B Packaging

The TRUPACT-II (Figure M1-8a) is a double-contained cylindrical shipping container 8 ft (2.4 m) in diameter and 10 ft (3 m) high. It meets NRC Type B shipping container requirements and has successfully completed rigorous container-integrity tests. The payload consists of approximately 7,265 lbs (3,300 kg) gross weight in up to fourteen 55-gal (208-L) drums, eight 85-gal (322-L) drums, six 100-gal (379-L) drums, two SWBs, or one TDOP.

HalfPACT Type B Packaging

The HalfPACT (Figure M1-8b) is a double-contained right cylindrical shipping container 7.8 ft (2.4 m) in diameter and 7.6 ft (2.3 m) high. It meets NRC Type B shipping container requirements and has successfully completed rigorous container-integrity tests. The payload consists of approximately 7,600 lbs (3,500 kg) gross weight in up to seven 55-gal (208-L) drums, one SWB, or four 85-gallon drums.

Unloading Docks

Each TRUDOCK is designed to accommodate up to two Contact-Handled Packages. The TRUDOCK functions as a work platform, providing TRU mixed waste handling personnel easy access to the container during unloading operations (see Figure M1-9) (Also see Drawing 41-M-001-W in Appendix D3 of the WIPP RCRA Part B Permit Application (DOE, 1997a)).

Forklifts

Forklifts will be used to transfer the Contact-Handled Packages into the WHB Unit and may be used to transfer palletized CH TRU mixed waste containers to the facility transfer vehicle. Another forklift will be used for general-purpose transfer operations. This forklift has attachments and adapters to handle individual TRU mixed waste containers, if required.

Cranes and Adjustable Center-of-Gravity Lift Fixtures

At each TRUDOCK, an overhead bridge crane is used with a specially designed lift fixture for disassembly of the Contact-Handled Packages. Separate lifting attachments have been specifically designed to accommodate SWBs and TDOPs. The lift fixture, attached to the crane, has built-in level indicators and two counterweights that can be moved to adjust the center of gravity of unbalanced loads and to keep them level.

Facility or Containment Pallets

The facility pallet is a fabricated steel unit designed to support 7-packs, 4-packs, or 3-packs of drums, SWBs, or TDOPs, and has a rated load of 25,000 lbs. (11,430 kg). The facility pallet will accommodate up to four 7-packs, four 3-packs, or four 4-packs of drums or four SWBs (in two stacks of two units), two TDOPs, or any combination thereof. Loads are secured to the facility pallet during transport to the emplacement area. Facility pallets are shown in Figure M1-10. Fork pockets in the side of the pallet allow the facility pallet to be lifted and transferred by forklift to prevent direct contact between TRU mixed waste containers and forklift tines. This 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 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)).

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 (147 ft^3 (4.2 m^3)) and one 55-gallon drum for derived waste 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 canister. A maximum of 10 drums and 6 loaded facility canisters (262 ft^3 (7.4 m^3)) and one 55-gallon drum for derived waste 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 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.

CNS 10-160B Drum Carriage

The CNS 10-160B drum carriage (Figure M1-25) is a steel device used to handle drums in the CNS 10-160B cask. The drum carriages are stacked two high in the CNS 10-160B cask during shipment. They are removed from the cask using a below-the-hook lifting device termed a pentapod. The drum carriage is rated to lift up to five drums with a maximum weight of 1000 pounds each.

RH Bay Overhead Bridge Crane

In the RH Bay, an overhead bridge crane is used to lift the cask from the trailer and place it on the Cask Transfer Car. It is also used to remove the impact limiters from the casks and the outer lid of the RH-TRU 72-B cask.

Cask Lifting Yoke

The lifting yoke is a lifting fixture that attaches to the RH Bay Overhead Bridge Crane and is designed to lift and rotate the RH-TRU 72-B cask onto the Cask Transfer Car.

Cask Transfer Car

The Cask Transfer Car (Figure M1-22 and M1-24) is a self-propelled, rail-guided vehicle, that transports the cask between the RH Bay and the Cask Unloading Room.

6.25 Ton Grapple Hoist

A 6.25 Ton Grapple Hoist is used to hoist the canister from the Transfer Cell Shuttle Car into the facility cask.

Facility Cask

The facility cask body consists of two concentric steel cylinders. The annulus between the cylinders is filled with lead, and gate shield valves are located at either end. Figure M1-23 provides an outline configuration of the facility cask. The canister is placed inside the facility cask for shielding during canister transfer from the RH Complex to the Underground HWDU for emplacement.

Facility Cask Transfer Car

The Facility Cask Transfer Car (Figure M1-24) is a self-propelled rail car that is used to move the facility cask between the Facility Cask Loading Room and the Shaft Station in the underground.

Hot Cell Bridge Crane

The Hot Cell Overhead Bridge Crane, outfitted with a rotating block and the Facility Grapple, will be used to lift the CNS 10-160B lid and the drum carriage units from the cask located in the Cask Unloading Room, into the Hot Cell. The Hot Cell Overhead Bridge Crane is also used to lift the empty disposal canisters into place within the Hot Cell, move loaded drums into the facility canister, and lower loaded canisters into the Transfer Cell.

Overhead Powered Manipulator

The Overhead Powered Manipulator is used in the Hot Cell to lift individual drums from the drum carriage unit and lower each drum into the facility canister and support miscellaneous Hot Cell operations.

Manipulators

There is a maximum of two operational sets of fixed Manipulators in the Hot Cell. The Manipulators collect swipes of drums as they are being lifted from the drum carriage unit and transfer the swipes to the Shielded Material Transfer Drawer and support Hot Cell operations.

Shielded Material Transfer Drawer

The Shielded Material Transfer Drawer is used to transfer swipe samples obtained by the fixed Manipulators to the Hot Cell Gallery for radiological counting and transferring small equipment into and out of the Hot Cell.

Closed-Circuit Television Camera

The Closed-Circuit Television Camera monitors Hot Cell and Transfer Cell operations. These operations are observed from the shielded room in the Facility Cask Loading Room and Hot Cell Gallery.

Transfer Cell Shuttle Car

The Transfer Cell Shuttle Car positions the loaded RH-TRU 72-B cask and shielded insert within the Transfer Cell.

Cask Unloading Room Crane

The Cask Unloading Room Crane lifts and suspends the RH-TRU 72-B cask or shielded insert from the Transfer Car and lowers the cask or shielded insert into the Transfer Cell Shuttle Car.

M1-1c(2) Parking Area Container Storage Unit (Parking Area Unit)

The parking area south of the WHB (see Figure M1-2) will be used for storage of waste containers within sealed shipping containers awaiting unloading. 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 Unit. The Parking Area Unit provides storage space ~~for 12~~ for up to 7,160 ft^3 (203 m^3) of TRU mixed waste, contained in up to 50 loaded Contact-Handled Packages and 14 Remote-Handled Packages~~, corresponding to 1,591 ft^3 (45 m^3) of CH TRU mixed waste~~. Secondary containment and protection of the waste containers from standing liquid are provided by the Contact-Handled or Remote-Handled Packaging. Wastes placed in the Parking Area Unit will remain sealed in their Contact-Handled or Remote-Handled Packages, at all times while in this area.

~~The maximum number of Contact-Handled Packages that will be stored in the parking area is twelve, containing a maximum of 1,591 ft^3 (45m^3) of CH TRU mixed waste.~~ The Nuclear Regulatory Commission (**NRC**) Certificate of Compliance requires that sealed Contact-Handled or Remote-Handled Packages which contain waste be vented every 60 days to avoid unacceptable levels of internal pressure. During normal operations the maximum residence time of any one container in the Parking Area Unit is typically five days. Therefore, during normal waste handling operations, no Contact-Handled or Remote-Handled Packages will require venting while located in the Parking Area Unit. Any off-normal event which results in the need to store a waste container in the Parking Area Unit for a period of time approaching fifty-nine (59) days shall be handled in accordance with Section M1-1e(2) of this Permit Attachment. Under no circumstances shall a Contact-Handled or Remote-Handled Package be stored in the Parking Area Unit for more than fifty-nine (59) days after the date that the inner containment vessel of the Contact-Handled or Remote-Handled Package~~s~~ was sealed at the generator site.

M1-1d Container Management Practices

20.4.1.500 NMAC (incorporating 40 CFR §264.173) requires that containers be managed in a manner that does not result in spills or leaks. Containers are required to be closed at all times, unless waste is being placed in the container or removed. Because containers at the WIPP will contain radioactive waste, safety concerns require that containers be continuously vented to obviate the buildup of gases within the container. These gases could result from radiolysis, which is the breakdown of moisture by radiation. The vents, which are nominally 0.75 in. (1.9 centimeters [cm]) in diameter, are generally installed on or near the lids of the containers. These vents are filtered so that gas can escape while particulates are retained.

TRU mixed waste containers, containing off-site waste, are never opened at the WIPP facility. Derived waste containers are kept closed at all times unless waste is being added or removed.

~~The typical processing rate for CH TRU mixed waste is 14 Contact-Handled Packages per day, or seven pallet loads, and the maximum is 28 per day. Two shifts per day are planned, four days per week. The fifth day is for equipment maintenance with weekends available for more extensive maintenance, when necessary.~~

Off-normal events could interrupt normal operations in the waste management process line. These off normal events fall into the following categories:

- Waste management system equipment malfunctions
- Waste shipments with unacceptable levels of surface contamination
- Hazardous Waste Manifest discrepancies that are not immediately resolved
- A suspension of emplacement activities for regulatory reasons

Shipments of waste from the generator sites will be stopped in any event which results in an interruption to normal waste handling operations that exceeds three days.

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.

M1-1d(1) Derived Waste

The WIPP facility operational philosophy is to introduce no new hazardous chemical components into TRU mixed waste or TRU mixed waste residues that could be present in the controlled area. This will be accomplished principally through written procedures and the use of Safe Work Permits (**SWP**)[1] and Radiological Work Permits (**RWP**)[2] which govern the activities within a controlled area involving TRU mixed waste. The purpose of this operating philosophy is to avoid generating TRU mixed waste that is compositionally different than the TRU mixed waste shipped to the WIPP facility for disposal.

Some additional TRU mixed waste, such as used personal protective equipment, swipes, and tools, may result from decontamination operations and off-normal events. Such waste will be assumed to be contaminated with RCRA-regulated hazardous constituents in the TRU mixed waste containers from which it was derived. Derived waste may be generated as the result of decontamination activities during the waste handling process. Should decontamination activities be performed, water and a cleaning agent such as those listed in Permit Attachment F will be used. Derived waste will be considered acceptable for management at the WIPP facility, because any TRU mixed waste shipped to the facility will have already been determined to be acceptable and because no new constituents will be added. Data on the derived waste will be entered into the WWIS database. Derived waste will be contained in standard DOT approved Type A containers.

The Safety Analysis Report (DOE 1997b) for packaging requires the lids of TRU mixed waste containers to be vented through high efficiency particulate air (**HEPA**)-grade filters to preclude container pressurization caused by gas generation and to prevent particulate material from escaping. Filtered vents used in CH TRU mixed waste containers (55-gal (208-L) drums, 85-gal (321 L) drums, 100-gal (379-L) drums, TDOPs, and SWBs) have an orifice approximately 0.375-in. (9.53-millimeters) in diameter through which internally generated gas may pass. The filter media can be any material (e.g., composite carbon, sintered metal).

As each derived waste container is filled, it will be closed with a lid containing a HEPA-grade. filter and moved to an Underground Hazardous Waste Disposal Unit (**HWDU**) using the same equipment used for handling TRU mixed waste.

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[1] SWPs are prepared to assure that any hazardous work (not already covered by a procedure) is performed with due precaution. SWPs are issued by the Permittees after a job supervisor completes the proper form detailing the job location, work description, personnel involved, specific hazards involved, and protective requirements. The Permittees review the form, check on the adequacy of the protective measures, and if sufficient, approve the work permit. Conditions of the SWPs must be met while any hazardous work is proceeding. Examples of activities covered by the SWP program include confined space entry, overhead work, and work on energized equipment.

[2] RWPs are used to control entry into and performance of work within. Managers responsible for work within a CA must generate a work permit that specifies the work scope, limiting conditions, dosimetry, respiratory protection, protective clothing, specific worker qualifications, and radiation safety technician support. RWPs are approved by the Permittees after thorough review. No work can proceed in a CA without a valid RWP.

M1-1d(2) CH TRU Mixed Waste Handling

CH TRU mixed waste containers will arrive by tractor-trailer at the WIPP facility in sealed shipping containers (e.g., TRUPACT-IIs or HalfPACTs) (see Figure M1-12), at which time they will undergo security and radiological checks and shipping documentation reviews. A forklift will remove the Contact-Handled Packages and will 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 TRUDOCKs in the TRUDOCK Storage Area of the WHB Unit, where an external survey of the Contact-Handled Package inner vessel (see Figure M1-8a and M1-8b) will be performed as the outer containment vessel lid is lifted. The inner vessel lid will be lifted under the TRUDOCK Vent Hood System (**VHS**), and the contents will be surveyed during and after this lift. The TRUDOCK VHS[3] is attached to the Contact-Handled Package to provide atmospheric control and confinement of headspace gases at their source. It also prevents potential personnel exposure and facility contamination due to the spread of radiologically contaminated airborne dust particles and minimizes personnel exposure to VOCs.

Contamination surveys at the WIPP facility are based in part on radiological surveys used to indicate potential releases of hazardous constituents from containers by virtue of detection of radioactive contamination (see Permit Attachment I3). Radiological surveys may be applicable to most hazardous constituent releases except the release of gaseous VOCs from TRU mixed waste containers. Radiological surveys provide the WIPP facility with a very sensitive method of indicating the potential release of nongaseous hazardous constituents through the use of surface sampling (swipes) and radioactivity counting. Radiological surveys are used in addition to the more conventional techniques such as visual inspection to identify spills.

Under normal operations, it is not expected that the waste containers will be externally contaminated or that removable surface contamination on the shipping package or the waste containers will be in excess of the DOE's free release limits (i.e.; < 20 disintegrations per minute (**dpm**)[4] per 100 cm^2 alpha or < 200 dpm per 100 cm^2 beta/gamma). In such a case, no further decontamination action is needed. The shipping package and waste container will be handled through the normal process. However, should the magnitude of contamination exceed the free release limits, yet still fall within the criteria for small area "spot" decontamination (i.e., less than

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[3] The TRU mixed waste container headspace may contain radiologically contaminated airborne dust particles.

1. Without the TRUDOCK VHS, a potential mechanism will exist to spread contamination (if present) in the immediate CH TRU mixed waste handling area, because lid removal will immediately expose headspace gases to prevailing air currents induced by the building ventilation system.

2. With the VHS, a confined and controlled set of prevailing air currents will be induced by the system blower. The TRUDOCK VHS will function as a local exhaust system to effectively control radiologically contaminated airborne dust particles (and VOCs) at essentially atmospheric pressure conditions.

   Functionally, the TRUDOCK VHS will draw the TRU mixed waste container headspace gases, convey them through a HEPA filter, and ultimately duct them through the WHB exhaust ventilation system. VOCs will pass through the HEPA filter and will be conveyed to the ventilation exhaust duct system. The system principally consists of a functional aggregation of 1) vent hood assembly, 2) HEPA filter assemblies (to capture any airborne radioactive particles), 3) blower (to provide forced airflow), 4) ductwork, and 5) flexible hose.

[4] The unit "dpm" stands for "disintegration per minute" and is the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

or equal to 100 times the free release limit and less than or equal to 6 ft^2 [0.56 m^2]), the shipping package or the waste container will be decontaminated. Decontamination activities will not be conducted on containers which are not in good condition, or containers which are leaking. Containers which are not in good condition, and containers which are leaking, will be overpacked, repaired/patched in accordance with 49 CFR §173 and §178 (e.g., 49 CFR §173.28), or returned to the generator. In addition, if during the waste handling process at the WIPP a waste container is breached, it will be overpacked, repaired/patched in accordance with 49 CFR §173 and §178 (e.g., 49 CFR §173.28), or returned to the generator. Should WIPP structures or equipment become contaminated, waste handling operations in the affected area will be immediately suspended.

Decontamination activities will use water and cleaning agents (see Permit Attachment F) so as to not generate any waste that cannot be considered derived waste. Items that are radiologically contaminated are also assumed to be contaminated with the hazardous wastes that are in the container involved in the spill or release. A complete listing of these waste components can be obtained from the WIPP Waste Identification System (**WWIS**), as described in Permit Attachment B, for the purpose of characterizing derived waste.

It is assumed that the process of decontamination will remove the hazardous waste constituents along with the radioactive waste constituents. To provide verification of the effectiveness of the removal of hazardous waste constituents, once a contaminated surface is demonstrated to be radiologically clean, the “swipe” will be sent for analysis for hazardous constituents. The use of these confirmation analyses is as follows:

For waste containers, the analyses becomes documentation of the condition of the container at the time of emplacement. The presence of hazardous waste constituents on a container after decontamination will be at trace levels and will likely not be visible and will not pose a threat to human health or the environment. These containers will be placed in the underground without further action once the radiological contamination is removed unless there is visible evidence of hazardous waste spills or hazardous waste on the container and this contamination is considered likely to be released prior to emplacement in the underground.

For area contamination, once the area is cleaned up and is shown to be radiologically clean, it will be sampled for the presence of hazardous waste residues. If the area is large, a sampling plan will be developed which incorporates the guidance of EPA's SW 846 in selecting random samples over large areas. Selection of constituents for sampling analysis will be based on information (in the WWIS) about the waste that was spilled and information on cleanup procedures. If the area is small, swipes will be used. If the results of the analysis show that residual contamination remains, a decision will be made whether further cleaning will be beneficial or whether final clean up shall be deferred until closure. For example, if hazardous constituents react with the floor coating and are essentially nonremovable without removing the coating, then clean up will be deferred until closure when the coatings will be stripped. In any case, appropriate notations will be entered into the operating record to assure proper consideration of formerly contaminated areas at the time of closure. Furthermore, measures such as covering, barricading, and/or placarding will be used as needed to mark areas that remain contaminated.

Small area decontamination, if needed, will occur in the area in which it is detected for contamination that is less than 6 ft^2 (0.56 m^2) in area and is less than 100 times the free release limit. The free release limit is defined by DOE Orders as alpha contamination less than 20 dpm/100 cm^2 and beta-gamma contamination less than 200 dpm/100 cm^2. Overpacking would occur in the event the WIPP staff damages an otherwise intact container during handling activities. In such a case, a radiological boundary will be established, inside which all activities are carefully controlled in accordance with the protocols for the cleanup of spills or releases. A plan of recovery will be developed and executed, including overpacking the damaged container in either a 85-gal (321 L) drum, SWB, or a TDOP. The overpacked container will be properly labeled and sent underground for disposal. The area will then be decontaminated and verified to be free of contamination using both radiological and hazardous waste sampling techniques (essentially, this is done with “swipes” of the surface for counting in sensitive radiation detection equipment or, if no radioactivity is present, by analysis for hazardous waste by an offsite laboratory).

In the event a large area contamination is discovered within a Contact-Handled Package during unloading, the waste will be left in the Contact-Handled Package and the shipping container will be resealed. The DOE considers such contamination problems the responsibility of the shipping site. Therefore, the shipper will have several options for disposition. These are as follows:

- The Contact-Handled Package can be returned to the shipper for decontamination and repackaging of the waste. Such waste would have to be re-approved prior to shipment to the WIPP.

- Shipment to another DOE site for management in the event the original shipper does not have suitable facilities for decontamination. If the repairing site wishes to return the waste to WIPP, the site will have to meet the characterization requirements of the WAP.

- The waste could go to a third (non-DOE) party for decontamination. In such cases, the repaired shipment would go to the original shipper and be recertified prior to shipment to the WIPP.

Written procedures specify materials, protocols, and steps needed to put an object into a safe configuration for decontamination of surfaces. A RWP will always be prepared prior to decontamination activities. TRU mixed waste products from decontamination will be managed as derived waste.[5]

The TRUPACT-II may hold up to two 7-packs, two 4-packs, two 3-packs, two SWBs, or one TDOP. A HalfPACT may hold seven 55-gal (208-L) drums, one SWB, or four 85-gallon drums. An overhead bridge crane will be used to remove the contents of the Contact-Handled Package and place them on a facility pallet. The containers will be visually inspected for physical damage (severe rusting, apparent structural defects, signs of pressurization, etc.) and leakage to ensure

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[5] Note that the DOE had previously proposed use of an Overpack and Repair Room to deal with major decontamination and overpacking activities. The DOE has eliminated the need for this area by: 1) limiting the size of contamination events that will be dealt with as described in this section, and 2) by performing overpacking at the point where a need for overpacking is identified instead of moving the waste to another area of the WHB. This strategy minimizes the spread of contamination.

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 deck, where the loaded facility pallet will be transferred to the waste hoist, 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 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, and shipping documentation reviews are performed. Upon completion of these checks, the Uniform Hazardous Waste Manifest is signed, and the generator's copy of the Uniform Hazardous Waste Manifest is returned to the generator. Should the surface dose rate 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.

RH-TRU 72-B Cask Unloading

The Cask Transfer Car then moves the RH-TRU 72-B cask to a work stand in the RH Bay. The work stand allows access to the head area of the RH-TRU 72-B cask for conducting radiological surveys, performing physical inspections or minor maintenance, and decontamination, if necessary. The outer lid bolts on the RH-TRU 72-B cask are removed, and the outer lid is removed to provide access to the lid of the cask inner containment vessel. The RH-TRU 72-B cask is moved into the Cask Unloading Room by a Cask Transfer Car and is positioned under the Cask Unloading Room Bridge Crane. The Cask Unloading Room Bridge Crane attaches to the RH-TRU 72-B cask and lifts and suspends the RH-TRU 72-B cask to clear the Cask Transfer Car. The RH-TRU 72-B cask is aligned over the Cask Unloading Room port.

The Cask Unloading Room shield valve is opened, and the cask is lowered through the port into the Transfer Cell Shuttle Car. The Cask Unloading Room Bridge Crane is unhooked and retracted, and the Cask Unloading Room shield valve is closed. After the cask is lowered into the Transfer Cell Shuttle Car, the bolts on the lid of the cask inner containment vessel are loosened by a robotic Manipulator. The Transfer Cell Shuttle Car is then aligned directly under the Transfer Cell shield valve in preparation for removing the inner vessel lid and transferring the canister to the facility cask. Operations in the Transfer Cell are monitored by closed-circuit video cameras.

Using the remotely-operated fixed 6.25 Ton Grapple Hoist in the Facility Cask Loading Room, the inner vessel lid is lifted clear of the RH-TRU 72-B cask, and the robotic Manipulator takes swipe samples and places them in a swipe delivery system for counting outside the Transfer Cell. If found to be contaminated above acceptable levels, a determination is made whether to return the canister and cask to the originating site or to overpack the canister. If no contamination is found, the Transfer Cell Shuttle Car moves a short distance, and the inner vessel lid is lowered onto a stand on the Transfer Cell Shuttle Car. The canister is transferred to the facility cask as described below.

CNS 10-160B Cask Unloading

After the lid bolts are removed, the CNS 10-160B cask is moved using the Cask Transfer Car from the RH Bay into the Cask Unloading Room and centered beneath the Hot Cell shield plug port. The Cask Unloading Room shield door is closed, and the inner and outer Hot Cell shield plugs are removed and set aside on the floor of the Hot Cell using the remotely operated Hot Cell Bridge Crane. The Hot Cell Bridge Crane is then lowered through the Hot Cell port and is connected to the CNS 10-160B cask lid rigging or lifting device. The Hot Cell Bridge Crane lifts the CNS 10-160B cask lid through the Hot Cell port and sets the lid aside on the Hot Cell floor.

Operations in the Hot Cell are monitored by closed-circuit television cameras. The drum carriage unit lifting fixture (hereafter referred to as lifting fixture) is attached to the Hot Cell Bridge Crane and lowered through the Hot Cell port. The lifting fixture is connected to the upper drum carriage unit contained in the CNS 10-160B cask. The Hot Cell Bridge Crane lifts the upper drum carriage unit from the CNS 10-160B cask through the port into the Hot Cell and sets it near the Hot Cell inspection station. The Hot Cell Bridge Crane again lowers the lifting fixture through the Hot Cell port and connects to the lower drum carriage unit. The Hot Cell Bridge

Crane lifts the lower drum carriage unit from the CNS 10-160B cask through the port into the Hot Cell and sets it near the upper drum carriage unit.

The Hot Cell Bridge Crane lifts the CNS 10-160B cask lid from the Hot Cell floor, lowers it through the Hot Cell port and onto the top of the CNS 10-160B cask. The inner and outer Hot Cell shield plugs are replaced. The Cask Unloading Room shield door is opened, and the CNS 10-160B cask is moved into the RH Bay using the Cask Transfer Car. The CNS 10-160B cask is inspected and surveyed, the lid and impact limiter are reinstalled on the CNS 10-160B cask, and it is prepared for transportation off-site.

The Hot Cell Bridge Crane connects to an empty facility canister, places it into a sleeve at the inspection station, and removes the canister lid. The Overhead Powered Manipulator or Hot Cell Crane lifts one drum from the drum carriage unit. The Hot Cell Manipulators collect swipe samples from the drum and transfer the swipes via the Transfer Drawer to the Hot Cell Gallery for counting. The drum identification number is recorded, and the recorded numbers are verified against the WWIS. If there are any discrepancies, the drum(s) in question are stored within the Hot Cell, and the generator/storage site 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).

Either the Overhead Powered Manipulator or Hot Cell Bridge Crane lowers the drum into the facility canister. This process is repeated to place three drums in the facility canister. The Hot Cell Bridge Crane or powered Manipulator lifts the canister lid and places it onto the facility canister. The lid is locked in place using a Manipulator or secured with the robotic welder. Each CNS 10-160B cask shipment will contain up to ten drums. Drums will be managed in sets of three. If there is a tenth drum, it will be placed in a facility canister or stored until WIPP receipt of the next CNS 10-160B cask shipment. The Hot Cell Bridge Crane lifts the canister and lowers it into the Transfer Cell.

To prepare to transfer a loaded facility canister from the Hot Cell to the Transfer Cell, a shielded insert is placed onto a Cask Transfer Car in the RH Bay. The Cask Transfer Car is then moved into the Cask Unloading Room and positioned under the Cask Unloading Room Bridge Crane. The Bridge Crane attaches to the shielded insert. The Cask Unloading Room Bridge Crane lifts and suspends the shielded insert clear of the Cask Transfer Car. The shielded insert is aligned over the Cask Unloading Room port. The floor valve is opened, and the shielded insert is lowered into the Transfer Cell Shuttle Car. The Cask Unloading Room Bridge Crane is unhooked and retracted, and the Cask Unloading Room shield valve is closed. The shielded insert is positioned under the Hot Cell port.

The Hot Cell Bridge Crane lifts a loaded, closed facility canister and positions it over the Hot Cell port. The Hot Cell shield valve is opened, and the crane lowers the canister through the port into the shielded insert positioned in the Transfer Cell Shuttle Car in the Transfer Cell. The Hot Cell Bridge Crane is disconnected from the facility canister and raised until the crane hook clears the Hot Cell shield valve. The Hot Cell shield valve is then closed.

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, 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 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 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.

M1-1e(1) WHB Unit

The waste containers in storage will be ~~visually~~ inspected visually or by closed-circuit television camera prior to each movement and, at a minimum, weekly, to ensure that the waste containers are in good condition and that there are no signs that a release has occurred. Waste containers will be visually inspected for physical damage (severe rusting, apparent structural defects, signs of pressurization, etc.) and leakage. 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. This visual inspection of CH TRU mixed waste containers shall not include the center drums of 7-packs and waste containers positioned such that visual observation is precluded due to the arrangement of waste assemblies on the facility pallets. If waste handling operations should stop for any reason with containers located in the TRUDOCK Storage Area in the Contact-Handled Package, primary waste container inspections will not be accomplished until the containers of waste are removed from the Contact-Handled Package. If the lid to the Contact-Handled Package inner container vessel is removed, radiological checks (swipes of Contact-Handled Package inner surfaces) will be used to determine if there is contamination within the Contact-Handled Package. Such contamination could indicate a waste container leak or spill. Using radiological surveys, a detected spill or leak of a radioactive contamination from a waste container will also be assumed to be a hazardous waste spill or release.

Inspections of the Shielded Storage Area designated for holding waste while manifest discrepancies are resolved~~,~~ are performed prior to use and weekly thereafter, so long as waste containers reside in the Shielded Storage Area. Waste containers residing within a Contact-Handled Package are not inspected, as described in the first bullet in Section M1-1e(2).

Waste containers will be inspected prior to reentering the waste management process line for downloading to the underground. Waste containers stored in this area will be inspected at least once weekly.

Loaded RH-TRU 72-B and CNS 10-160B casks will be inspected when present in the RH Bay. Physical or closed-circuit television camera inspections of the RH Complex are conducted as described in Table D-1a. Canisters loaded in an RH-TRU 72-B cask are inspected in the Transfer Cell during transfer from the cask to the facility cask. Waste containers received in CNS 10-160B casks are inspected in the Hot Cell during transfer from the cask to the CNS 10-160B facility canister by camera and/or visual inspection (through shield windows).

M1-1e(2) Parking Area Unit

Inspections will be conducted in the Parking Area Unit at a frequency not less than once weekly when waste is present. These inspections are applicable to loaded, stored Contact-Handled and Remote-Handled Packages. The perimeter fence located at the lateral limit of the Parking Area Unit, coupled with personnel access restrictions into the WHB, will provide the needed security. The perimeter fence and the southern border of the WHB shall mark the lateral limit of the Parking Area Unit (Figure M1-2). Inspections of the Contact-Handled or Remote-Handled Packages stored in the Parking Area Unit will focus on the inventory and integrity of the shipping containers and the spacing between Contact-Handled and Remote-Handled Packages. This spacing will be maintained at a minimum of four feet.

Contact-Handled and Remote-Handled Packages located in the Parking Area Unit will be inspected weekly during use and prior to each reuse.

Inspection of waste containers is not possible when the containers are in their shipping container (e.g., casks, TRUPACT-II or HalfPACTs). Inspections can be accomplished by bringing the shipping containers into the WHB Unit and opening them and lifting the waste containers out for inspection. The DOE, however, believes that removing containers strictly for the purposes of inspection results in unnecessary worker exposures and subjects the waste to additional handling. The DOE has proposed that waste containers need not be inspected at all until they are ready to be removed from the shipping container for emplacement underground. Because shipping containers are sealed and are of robust design, no harm can come to the waste while in the shipping containers and the waste cannot leak or otherwise be released to the environment. Contact-Handled or Remote-Handled Packages shall be opened every 60 days for the purposes of venting, so that the longest waste would be uninspected would be for 60 days from the date that the inner containment vessel of the Contact-Handled or Remote-Handled Package was closed at the generator site. Venting the Contact-Handled or Remote-Handled Packages involves removing the outer lid and installing a tool in the port of the inner lid.

The following strategy will be used for inspecting waste containers that will be retained within their shipping containers for an extended period of time:

- If the reason for retaining the TRU mixed waste containers in the shipping container is due to an unresolved manifest discrepancy, the DOE will return the shipment to the generator prior to the expiration of the 60 day NRC venting period or within 30 days after receipt at the WIPP, whichever comes sooner. In this case, no inspections of the internal containers will be performed. The stored Contact-Handled or Remote-Handled Package will be inspected weekly as described above.

- If the reason for retaining the TRU mixed waste containers in the Contact-Handled or Remote-Handled Package is due to an equipment malfunction that prevents unloading the waste in the WHB Unit, the DOE will return the shipment to the generator prior to the expiration of the 60 day NRC venting period. In this case, the DOE would have to ship the TRU mixed waste containers back with sufficient time for the generator to vent the shipment within the 60 day limit. In this case, no inspections of the internal containers will be performed. The stored Contact-Handled or Remote-Handled Package will be inspected weekly as described above.

- If the reason for retaining the TRU mixed waste containers is due to an equipment malfunction that prevents the timely movement of the waste containers into the underground, the waste containers will be kept in the Contact-Handled or Remote-Handled Package until day 30 (after receipt at the WIPP) or the expiration of the 60 day limit, whichever comes sooner. At that time the Contact-Handled or Remote-Handled Package will be moved into the WHB and the TRU mixed waste containers removed and placed in one of the permitted storage areas in the WHB Unit. If there is no additional space within the permitted storage areas of the WHB

Unit, the DOE will discuss an emergency permit with the NMED for the purposes of storing the waste elsewhere in the WHB Unit. Waste containers will be inspected when removed from the Contact-Handled Packaging and weekly while in storage in the WHB Unit. Contact-Handled or Remote-Handled Packages will be inspected weekly while they contain TRU mixed waste containers as discussed above.

The DOE believes that this strategy minimizes both the amount of shipping that is necessary and the amount of waste handling, while maintaining a reasonable inspection schedule. The DOE will stop shipments of waste for any equipment outage that will extend beyond three days.

M1-1f Containment

The WHB Unit has concrete floors, which are sealed with a coating that is designed to resist all but the strongest oxidizing agents. Such oxidizing agents do not meet the TSDF-WAC and will not be accepted in TRU mixed waste at the WIPP facility. Therefore, TRU mixed wastes pose no compatibility problems with respect to the WHB Unit floor. The floor coating consists of Carboline® 1340 clear primer-sealer on top of prepared concrete, Carboline® 191 primer epoxy, and Carboline® 195 surface epoxy. The manufacturer's chemical resistance guide shows "Very Good" for acids and "Excellent" for alkalies, solvents, salt, and water. Uses are indicated for nuclear power plants, industrial equipment and components, chemical processing plants, and pulp and paper mills for protection of structural steel and concrete. During the Disposal Phase, should the floors need to be re-coated, any floor coating used in the WHB Unit TRU mixed waste handling areas will be compatible with the TRU mixed waste constituents and will have chemical resistance at least equivalent to the Carboline® products. Figure M1-1~~4 is a plan view of the WHB, showing areas~~ shows where ~~CH~~ TRU mixed waste handling activities discussed in this section occur.

During normal operations, the floor of the storage areas within the WHB Unit shall be visually inspected on a weekly basis to verify that it is in good condition and free of obvious cracks and gaps. Floor areas of the WHB Unit in use during off-normal events will be inspected prior to use and weekly thereafter. All TRU mixed waste containers located in the permitted storage areas shall be elevated at least 6 in. (15 cm) from the surface of the floor. TRU mixed waste containers that have been removed from Contact-Handled or Remote-Handled Packaging shall be stored at a designated storage area inside the WHB Unit so as to preclude exposure to the elements.

Secondary containment at the ~~NE~~ CH Bay Storage Area and the Shielded Storage Area inside the WHB Unit shall be provided by the WHB Unit floor (See Figure M1-1). The WHB Unit is engineered such that during normal operations, the floor capacity is sufficient to contain liquids upon release. Secondary Containment at the Derived Waste Storage Area of the WHB Unit will be provided by a polyethylene standard drum pallet. The Parking Area Unit and TRUDOCK Storage Area of the WHB Unit require no engineered secondary containment since no waste is to be stored there unless it is protected by the Contact-Handled or Remote-Handled Packaging.

Calculations to determine the floor surface area required to provide secondary containment in the event of a release are based on the maximum quantity of liquid which could be present within ten percent of one percent of the volume of all the containers or one percent of the capacity of the largest single container, whichever is greater.

Secondary containment at storage locations inside the RH Bay and Cask Unloading Room is provided by the cask. Secondary containment at storage locations inside the Transfer Cell is provided by the RH-TRU 72-B cask or shielded insert. Secondary containment at storage locations in the Facility Cask Loading Room is provided by the facility cask. In the Hot Cell, waste containers are stored in either the drum carriage unit or in canister sleeves. The Lower Hot Cell provides secondary containment as described in section M1-f(2). In addition, the RH Bay, Hot Cell, and Transfer Cell contain 220-gallon (833-L) (Hot Cell), 11,400-gallon (43,152-L) (RH Bay), and 220-gallon (833-L) (Transfer Cell) sumps, respectively, to collect any liquids.

M1-1f(1) Secondary Containment Requirements for the WHB Unit

The maximum volume of TRU mixed waste on facility pallets that will be stored in the CH Bay Storage Area, and Shielded Storage Area of the WHB is 18 facility pallets @ 2 TDOPs per pallet = 36 TDOPs of waste. 36 TDOPs @ 1,200 gal (4,540 L) per TDOP = 43,200 gal (163,440L) waste container capacity. 43,200 gal (163,440 L) x ten percent of the total volume = 4,320 gal (16,344 L) of waste. Since 4,320 gal (16,344 L) is greater than 1,200 gal (4,540 L), the configuration of possible TDOPs in the storage area is used for the calculation of secondary containment requirements. 4,320 gal (16,344 L) of liquid x one percent liquids = 43.2 gal (163.4 L) of liquid for which secondary containment is needed.

~~The maximum volume of TRU mixed waste that will be stored in the NE Storage Area of the WHB Unit is seven facility pallets @ 4 SWBs per pallet = 28 SWBs of waste. 28 SWBs @ 496 gal (1,878 L) per SWB = 13,888 gal (52,570 L) waste container capacity. 13,888 gal (52,570 L) x ten percent of the total volume = 1,389 gal (5,258 L) of waste. Since 1,389 gal (5,263 L) is greater than 496 gal (1,878 L), the volume of the largest single container, the configuration of all SWBs in the storage area is used for the calculation of secondary containment requirements. 1,389 gal (5,258 L) of liquid x one percent liquids = 13.9 gal (52.6 L) of liquid for which secondary containment is needed.~~

~~The maximum volume of TRU mixed waste that will be stored in the Shielded Storage Area of the WHB Unit is one facility pallet @ 4 SWBs per pallet = 4 SWBs of waste. 4 SWBs @ 496 gal (1,878 L) per SWB = 1,984 gal (7,510 L) waste container capacity. 1,984 gal (7,510 L) x ten percent of the total volume = 198.4 gal (751 L) of waste. Since 198.4 gal (751 L) is less than 496 gal (1,878 L), the volume of the largest single container, the volume of the largest container (an SWB) in the storage area is used for the calculation of secondary containment requirements. 496 gal (1,878 L) of liquid x one percent liquids = 4.96 gal (18.8 L) of liquid for which secondary containment is needed.~~

The maximum volume of TRU mixed waste that will be stored in the Derived Waste Storage Area of the WHB Unit is one SWB. 1 SWBs @ 496 gal (1,878 L) per SWB = 496 gal (1,878 L) waste container capacity. Since the maximum storage volume of 496 gal (1,878 L) is equal to the volume of the largest single container, the volume of the a single SWB is used for the calculation of secondary containment requirements. 496 gal (1,878 L) of liquid x one percent liquids = 4.96 gal (18.8 L) of liquid for which secondary containment is needed.

The maximum volume of TRU mixed waste that will be stored in the Hot Cell is 10 RH TRU drums @ 55 gal (210 L) per drum = 550 gal (2100 L) of waste in drums. Additionally, 6 RH TRU facility canisters @ 235 gal (891L) per canister = 1,410 gal (5,346 L) of waste in canisters for a combined total 1,960 gal (7,419L). And 1,960 gal (7,419 L) of waste x ten percent of total volume = 196 gal (741.9 L) of waste. Secondary containment for liquids will need to have a capacity 196 gal (741.9L). Since 196 gal (741.9 L) is less than the volume of the single container of 235 gal (890 L) therefore, the larger volume is used for determining the secondary containment requirements. 235 gal (890 L) of waste x one percent liquids = 2.35 gal (8.9 L) of liquid needed for secondary containment.

The maximum volume of TRU mixed waste that will be stored in the Transfer Cell is one RH TRU canister or one RH TRU facility canister @ 235 gal (890 L) per canister x ten percent of total volume = 23.5 gal (8.90 L) of waste. Since 23.5 gal (8.90 L) is less than the volume of the single container of 235 gal (890 L) therefore, the larger volume is used for determining the secondary containment requirements. 235 gal (890 L) of waste x one percent liquids = 2.35 gal (8.9 L) of liquid needed for secondary containment.

M1-1f(2) Secondary Containment Description

The following is a calculation of the surface area the quantities of liquid would cover. Using a conversion factor of 0.1337 ft^3/gal (0.001 m^3/L) and assuming the spill is 0.0033 ft (0.001 m) thick, the following calculation can be used:

gallons x cubic feet per gallon ÷ thickness in feet = area covered in square feet

~~NE Storage Area~~ CH Bay Storage Area and Shielded Storage Area

~~13.9~~ 43.2 gal x 0.1337 ft^3/gal ÷ 0.0033 ft = ~~563~~ 1,750 ft^2 (~~52.3~~ 162.7 m^2)

~~Shielded Storage Area~~

~~4.96 gal x 0.1337 ft^3/gal ÷ 0.0033 ft = 201 ft^2 (18.67 m^2)~~

Hot Cell

2.35 gal x 0.1337 ft^3/gal ÷ 0.0033 ft = 95 ft^2 (8.8 m^2)

Transfer Cell

2.35 gal x 0.1337 ft^3/gal ÷ 0.0033 ft = 95 ft^2 (8.8 m^2)

The WHB Unit has 33,175 ft^2 (3,082 m^2) of floor space, the ~~NE~~ CH Bay Storage Area in the northeast corner of the WHB Unit (Figure M1-7) has ~~2,924~~ 20,574 ft^2 (~~272~~ 1,911 m^2) of floor space, and the Shielded Storage Area has 292.5 ft^2 (27.2 m^2) of floor space. The CH Bay Storage Area and Shielded Storage Area requires 1,750 ft^2 (162.7 m^2) for containment, Thus, the floor area of the ~~NE~~ CH Bay Storage Area and the Shielded Storage Area of the WHB Unit provide sufficient secondary containment to contain a release of ten percent of one percent of the volume of all of the containers, or one percent of the capacity of the largest container, whichever is greater.

The Hot Cell and Transfer Cell are the only portions of the RH Complex managing RH TRU mixed waste outside of casks or canisters. The Hot Cell has 1,841 ft^2 (171 m^2) of floor space and the Transfer Cell has 1,003 ft^2 (93 m^2) of floor space. The Hot Cell and Transfer Cell require only 95 ft^2 for containment, therefore there is sufficient floor space to contain a release of ten percent of one percent of containers in these storage areas.

In addition, both the Hot Cell and the Transfer Cell each contain a 220 gal (833 L) sump that will collect any liquids that spill from containers.

Derived Waste Storage Area

The derived waste containers in the Derived Waste Storage Area will be stored on standard drum pallets, which provides approximately 50 gal (190 L) of secondary containment capacity. Thus the secondary containment capacity of the standard drum pallet is sufficient to contain a release of ten percent of one percent of the largest container (4.96 gal or 18.8 L).

Parking Area Unit

Containers of TRU mixed waste to be stored in the Parking Area Unit will be in Contact-Handled or Remote-Handled Packages. There will be no additional requirements for engineered secondary containment systems.

M1-1g Special Requirements for Ignitable, Reactive, and Incompatible Waste

Special requirements for ignitable, reactive, and incompatible waste are addressed in 20.4.1.500 NMAC (incorporating 40 CFR §§264.176 and 264.177). Permit Module II precludes ignitable, reactive, or incompatible waste at the WIPP. No additional measures are required.

M1-1h Closure

Clean closure is planned in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.178) for all permitted container storage areas. The applicable areas and the plans for clean closure are detailed in Permit Attachment I.

M1-1i Control of Run On

The WHB Unit is located indoors which prevents run-on from a precipitation event. In addition, the CH TRU containers are stored on facility pallets, containment pallets, or standard drum pallets, which elevate the CH TRU mixed waste containers at least 6 in. (15 cm) off the floor, or in Contact-Handled or Remote-Handled Packages, so that any firewater released in the building will not pool around containers. Within the RH Bay, Cask Unloading Room, Transfer Cell, and Facility Cask Loading Room, waste containers are stored in casks or shielded inserts and protected from any potential run on. Any firewater released in the building will not pool around the waste containers as they are stored in casks, or shielded inserts. Within the Hot Cell, there is no source of water during operations. However, control of run-on is provided by the Lower Hot

Cell, which lies below a sloped floor surrounded by a grating and canister sleeves in the Hot Cell above.

In the Parking ~~Lot~~ Area Unit, the containers of TRU mixed waste are always in Contact-Handled or Remote-Handled Packages which protect them from precipitation and run on. Therefore, the WIPP container storage units will comply with the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.175(b)(4)).

References

DOE, 1997a. Resource Conservation and Recovery Act Part B Permit Application, Waste Isolation Pilot Plant (WIPP), Carlsbad, New Mexico, Rev. 6.5, 1997.

DOE, 1997b. Waste Isolation Pilot Plant Safety Analysis Report (DOE/WIPP-95-2065, Rev. 1), U.S. Department of Energy, Carlsbad Area Office, Carlsbad, NM, April 1997.

TABLES

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TABLE M1-1
BASIC DESIGN REQUIREMENTS, PRINCIPAL CODES, AND STANDARDS

	STRUCTURE/SUPPORTS			LIQUID AND PROCESS AIR HANDLING PROCESSING AND STORAGE EQUIPMENT							AIR HDLG DUCTING & FANS	HVAC FILTERS		MECHANICAL HANDLING EQUIPMENT			INSTRUMENTATION AND ELECTRICAL			QUALITY ASSURANCE PROGRAM	
					PIPING & VALVES																
	DBE DBT ACI-318 AISC	ANSI A58.1	SITE-SPECIFIC REQUIRE-MENTS	VESSEL ASME VIII NFPA[e]	ANSI BBB,1 NFPA[e]	UP	PUMPS API-610 NFPA[e]	STORAGE TANKS API-650 OR API-620	HEAT EXCHGRS ASME VIII TEMA	ALL OTHER EQUIPMENT MFRs STD	ARI SMACNA AMCA	PRE-FILTERS ASHRAE 52.68	HEPA FILTERS MIL F 51068C ANSI N 509 ANSI N 510	CRANE AND RELATED EQUIPMENT CMAA	CMAA AISC AWS	ALL OTHER EQUIP-MEANT MFRs STD	A-NE	ANSI SODS OR NAT'L ELECT-TRIAL CODE	IA/ MFRs STD	ANSI/ASME NQA-1 AND SUPPLE-MENTS	COM. AND INDUSTRY PRACTICES
DESIGN CLASS I	X		a	X f			X	X	X		X c	X c,d	X c	X	X		X	X		X	
DESIGN CLASS II	a,b	X	a	X	X		X	X	X		X c	X c	X c	X	X			X	X	X	
DESIGN CLASS IIIA	a	X	a	a	X		a			X	X c	X c	X c	a	a	X		X	X	X	
DESIGN CLASS III		X	g		a	X				X	X	X	X			X		X	X		X

X = Minimum Requirements
[a] Requirements to be determined on a case-by-case basis.
[b] Required for structure and supports needed for confinement and control of radioactivity.
[c] Except structures and supports that are designed to withstand a design-basis earthquake (DBE)/design-basis tornado (DBT) when specified in column 1 of this table.
[d] Underwriter's Laboratory (UL) Class I Listed.
[e] For fire-protection systems.
[f] American Society for Mechanical Engineers (ASME) III for other Class I vessels.
[g] Design of underground structures, mining equipment, and facilities are basically governed by the MSHA and experience in local mines.

ACI = American Concrete Institute
AISC = American Institute of Steel Construction
AMCA = Air Moving and Conditioning Association
ANSI = American National Standards Institute
API = American Petroleum Institute
ARI = Air Conditioning and Refrigeration Institute
ASHRAE = American Society of Heating, Refrigeration, and Air Conditioning Engineers, Inc.
AWS = American Welding Society
CMAA = Crane Manufacturers Association
DBE = Design-basis earthquake
DBT = Design-basis tornado
HEPA = High-efficiency particulate air
HVAC = Heating, Ventilation, and Air-Conditioning
A = Institute of Electronics and Electronic Engineers
IA = Instrument Society of America
MFR = Manufacturer
MIL = Military (specification)
MSHA = Mine Safety and Health Administration
NFPA = National Fire Protection Association
NQA = Nuclear Quality Assurance (Standard)
SMACNA = Sheet Metal and Air Conditioning Contractors National Association, Inc.
STD = Standard
TEMA = Tubular Exchanger Manufacturers Association
UP = Uniform Plumbing Code

TABLE M1-2
WASTE HANDLING EQUIPMENT CAPACITIES

CAPACITIES FOR EQUIPMENT	
CH Bay overhead bridge crane	12,000 lbs.
CH Bay forklifts	26,000 lbs.
Facility Pallet	25,000 lbs.
Adjustable center-of-gravity lift fixture	10,000 lbs.
Facility Transfer Vehicle	26,000 lbs.
MAXIMUM GROSS WEIGHTS OF CONTAINERS	
Seven-pack of 55-gallon drums	7,000 lbs.
Four-pack of 85-gallon drums	4,500 lbs.
Three-pack of 100-gallon drums	3,000 lbs.
Ten-drum overpack	6,700 lbs.
Standard waste box	4,000 lbs.
MAXIMUM NET EMPTY WEIGHTS OF EQUIPMENT	
TRUPACT-II	13,140 lbs.
HalfPACT	10,500 lbs.
Adjustable center of gravity lift fixture	2,500 lbs.
Facility pallet	4,120 lbs.

TABLE M1-3
RH TRU MIXED WASTE HANDLING EQUIPMENT CAPACITIES

CAPACITIES FOR EQUIPMENT	
RH Bay Bridge Crane	140 tons main hoist 25 tons auxiliary hoist
RH-TRU 72-B Cask Transfer Car	20 tons
CNS 10-160B Cask Transfer Car	35 tons
Transfer Cell Shuttle Car	29 tons
Hot Cell Crane	15 tons
Overhead Powered Manipulator	2.5 tons
Facility Cask Rotation Fixture	No specific load rating
Cask Unloading Room Crane	25 tons
6.25 Ton Grapple Hoist	6.25 tons
Facility Cask Transfer Car	40 tons
MAXIMUM GROSS WEIGHTS OF RH TRU CONTAINERS	
RH TRU Mixed Waste Canister	8,000 lbs
55-Gallon Drum	1,000 lbs
RH TRU Facility Canister	10,000 lbs
MAXIMUM NET EMPTY WEIGHTS OF EQUIPMENT	
Shielded RH-TRU 72-B Cask	37,000 lbs
Shielded CNS 10-160B Cask	57,500 lbs
Facility Cask	67,700 lbs

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FIGURES

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Figure M1-1
Waste Handling Building - Container Storage Unit

Figure M1-1a
Waste Handling Building Plan (Ground Floor)

Figure M1-2
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Figure M1-3
Standard 55-Gallon Drum (Typical)

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Waste Handling Building - Facility Pallet Temporary Storage Area

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TRUPACT-II Shipping Container for CH Transuranic Mixed Waste (Schematic)

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Typical HalfPACT Shipping Container for CH Transuranic Mixed Waste (Schematic)

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Figure M1-10
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Typical Containment Pallet

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Figure M1-12
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Figure M1-13
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Figure M1-14
Waste Handling Building Plan (Ground Floor)

Figure M1-14a
RH Bay Ground Floor

Figure M1-15
100-Gallon Drum

Figure M1-16
RH-TRU Facility Canister Assembly

Figure M1-17a
RH Bay, Cask Unloading Room, Hot Cell, Facility Cask Loading Room

Figure M1-17b
RH Hot Cell Storage Area

Figure M1-17c
RH Canister Transfer Cell Storage Area

Figure M1-17d
RH Facility Cask Loading Room Storage Area

Figure M1-18
RH-TRU 72-B Shipping Cask on Trailer

Figure M1-19
CNS 10-160B Shipping Cask on Trailer

Figure M1-20
RH-TRU 72-B Shipping Cask for RH Transuranic Waste (Schematic)

Figure M1-21
CNS 10-160B Shipping Cask for RH Transuranic Waste (Schematic)

Figure M1-22
Example of RH Cask Transfer Car (Side View)

Figure M1-23
RH Transuranic Waste Facility Cask

Figure M1-24
RH Facility Cask Transfer Car (Side View)

Figure M1-25
CNS 10-160B Drum Carriage

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

Figure M1-28
Schematic of the RH Transuranic Mixed Waste Process for RH-TRU 72-B Shipping Cask

Figure M1-29
Schematic of the RH Transuranic Mixed Waste Process for CNS 10-160B Shipping Cask

ATTACHMENT M2

GEOLOGIC REPOSITORY

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ATTACHMENT M2

GEOLOGIC REPOSITORY

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ATTACHMENT M2

GEOLOGIC REPOSITORY

M2-1 Description of the Geologic Repository

Management, storage, and disposal of transuranic (**TRU**) mixed waste in the Waste Isolation Pilot Plant (**WIPP**) geologic repository is subject to regulation under Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1 (20.4.1 NMAC), Subpart V. The WIPP is a geologic repository mined within a bedded salt formation, which is defined in 20.4.1.101 NMAC (incorporating 40 CFR §260.10) as a miscellaneous unit. As such, HWMUs within the repository are eligible for permitting according to 20.4.1.101 NMAC (incorporating 40 CFR §260.10), and are regulated under 20.4.1.500 NMAC, Miscellaneous Units.

As required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601), the Permittees shall ensure that the environmental performance standards for a miscellaneous unit, which are applied to the Underground Hazardous Waste Disposal Units (**HWDUs**) in the geologic repository, will be met.

The Disposal Phase will consist of receiving contact-handled (**CH**) and remote-handled (**RH**) TRU mixed waste shipping containers, unloading and transporting the waste containers to the Underground HWDUs, emplacing the waste in the Underground HWDUs, and subsequently achieving closure of the Underground HWDUs in compliance with applicable State and Federal regulations.

The WIPP geologic repository is mined within a 2,000-feet (ft) (610-meters (m))-thick bedded-salt formation called the Salado Formation. The Underground HWDUs (miscellaneous units) are located 2,150 ft (655 m) beneath the ground surface. TRU mixed waste management activities underground will be confined to the southern portion of the 120-acre (48.5 hectares) mined area during the Disposal Phase. During the initial term of this Permit, disposal of containers of CH TRU mixed waste will occur only in the seven HWDUs designated as Panels 1-7 (See Figure M2-1). RH TRU mixed waste disposal may begin in Panel 3. In the future, the Permittees may request a Permit to dispose of containers of CH and RH TRU mixed waste in additional panels that meet the definition of the HWDU in Permit Module IV. In addition, the Permittees may also request in the future a Permit to allow disposal of containers of TRU mixed waste in the north-south entries marked as E-300, E-140, W-30, and W-170, between S-1600 and S-3650. These areas are referred to as the disposal area access drifts and have been designated as Panels 9 and 10 in Figure M2-1. This Permit, during its initial 10-year term, authorizes the excavation of Panels 2 through 10 and the disposal of waste in Panels 1 through 7.

Panels 1 through 7 will consist of seven rooms and two access drifts each. Access drifts connect the rooms and have the same cross section (see Section M2-2a(3)). The closure system installed in each HWDU after it is filled will prevent anyone from entering the HWDU and will stop ventilation airflow. The point of compliance for air emissions from the Underground is Sampling Station VOC-A, as defined in Permit Attachment N (Confirmatory Volatile Organic Compound Monitoring Plan). Sampling Station VOC-A is the location where the concentration of volatile organic compounds (VOCs) in the air emissions from the Underground HWDUs will be 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 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 ~~4,187,000~~ 4,635,050 cubic feet (ft^3) (~~118,500~~ 131,250 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 3 through 7 provide room for up to 114,750 ft^3 (3,250 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.

As a part of the design validation process, geomechanical tests were conducted in SPDV test rooms. During the tests, salt creep rates were measured. Separation of bedding planes and fracturing were also observed. Consequently, a ground-control strategy was implemented. The ground-control program at the WIPP facility mitigates the potential for roof or rib falls and maintains normal excavation dimensions, as long as access to the excavation is possible.

M2-2a(1) CH TRU Mixed Waste Handling Equipment

The following are the major pieces of equipment used to manage CH TRU waste in the geologic repository. A summary of equipment capacities, as required by 20.4.1.500 NMAC is included in Table M2-1.

Facility Pallets

The facility pallet is a fabricated steel unit designed to support 7-packs, 3-packs, or 4-packs of drums, SWBs, or ten-drum overpacks (**TDOPs**), and has a rated load of 25,000 pounds (lbs.) (11,430 kilograms (kg)). The facility pallet will accommodate up to four 7-packs, four 3-packs, or four 4-packs of drums, four SWBs (in two stacks of two units), or two TDOPs. Loads are secured to the facility pallet during transport to the emplacement area. Facility pallets are shown in Figure M2-3. Fork pockets in the side of the pallet allow the facility pallet to be lifted and transferred by forklift to prevent direct contact between TRU mixed waste containers and forklift tines. This arrangement reduces the potential for puncture accidents. 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.

Backfill

Magnesium oxide (**MgO**) will be used as a backfill in order to provide chemical control over the solubility of radionuclides in order to comply with the requirements of 40 CFR §191.13. The MgO backfill will be purchased prepackaged in the proper containers for emplacement in the underground. Purchasing prepackaged backfill eliminates handling and placement problems associated with bulk materials, such as dust creation. In addition, prepackaged materials will be easier to emplace, thus reducing potential worker exposure to radiation. Should a backfill container be breached, MgO is benign and cleanup is simple. No hazardous waste would result from a spill of backfill.

The MgO backfill will be managed in accordance with Specification D-0101 (MgO Backfill Specification) and WP05-WH1011 (CH Waste Processing). These specifications are kept on file at the WIPP facility by the Permittees.

Backfill will be handled in accordance with standard operating procedures. Typical emplacement configurations are shown in Figures M2-5 and M2-5a.

Quality control will be provided within standard operating procedures to record that the correct number of sacks are placed and that the condition of the sacks is acceptable.

Backfill placed in this manner is protected until exposed when sacks are broken during creep closure of the room and compaction of the backfill and waste. Backfill in sacks utilizes existing 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 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 the Waste Shaft and is a multirope, friction-type hoist. A counterweight is used to balance the waste hoist conveyance. The waste hoist 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 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.

M2-2a(2) Shafts

The WIPP facility uses four shafts: the Waste Shaft, the Salt Handling Shaft, the Air Intake Shaft, and the Exhaust Shaft. These shafts are vertical openings that extend from the surface to the repository level.

The Waste Shaft is located beneath the WHB and is 19 to 20 ft (5.8 to 6.1 m) in diameter. The Salt Handling Shaft, located north of the Waste Shaft beneath the salt handling headframe, is 10 to 12 ft (3 to 3.6 m) in diameter. Salt mined from the repository horizon is removed through the Salt Handling Shaft. The Salt Handling Shaft is the main personnel and materials hoist and also serves as a secondary-supply air duct for the underground areas. The Air Intake Shaft, northwest of the WHB, varies in diameter from 16 ft 7 in. (4.51 m) to 20 ft 3 in. (6.19 m) and is the primary source of fresh air underground. The Exhaust Shaft, east of the WHB, is 14 to 15 ft (4.3 to 4.6 m) in diameter and serves as the exhaust duct for the underground air.

Openings excavated in salt experience closure because of salt creep (or time-dependent deformation at constant load). The closure affects the design of all of the openings discussed in this section. Underground excavation dimensions, therefore, are nominal, because they change with time. The unlined portions of the shafts have larger diameters than the lined portions, which allows for closure caused by salt creep. Each shaft includes a shaft collar, a shaft lining, and a shaft key section. The Final Design Validation Report in Appendix D1 of the WIPP RCRA Part B Permit Application (DOE, 1997) discusses the shafts and shaft components in greater detail.

The reinforced-concrete shaft collars extend from the surface to the top of the underlying consolidated sediments. Each collar serves to retain adjacent unconsolidated sands and soils and to prevent surface runoff from entering the shafts. The shaft linings extend from the base of the collar to the top of the salt beds approximately 850 ft (259 m) below the surface. Grout injected behind the shaft lining retards water seeping into the shafts from water-bearing formations, and the liner is designed to withstand the natural water pressure associated with these formations. The shaft liners are concrete, except in the Salt Handling Shaft, where a steel shaft liner has been grouted in place.

The shaft key is a circular reinforced concrete section emplaced in each shaft below the liner in the base of the Rustler and extending about 50 ft (15 m) into the Salado. The key functions to resist lateral pressures and assures that the liner will not separate from the host rocks or fail under tension. This design feature also aids in preventing the shaft from becoming a route for groundwater flow into the underground facility.

On the inside surface of each shaft, excluding the Salt Handling Shaft, there are three water-collection rings: one just below the Magenta, one just below the Culebra, and one at the lowermost part of the key section. These collection rings will collect water that may seep into the shaft through the liner. The Salt Handling Shaft has a single water collection ring in the lower part of the key section. Water collection rings are drained by tubes to the base of the shafts where the water is accumulated.

WIPP shafts and other underground facilities are, for all practical purposes, dry. Minor quantities of water (which accumulate in some shaft sumps) are insufficient to affect the waste disposal area. This water is collected, brought to the surface, and disposed of in accordance with current standards and regulations.

The Waste Shaft is protected from precipitation by the roof of the waste hoist headframe tower. The Exhaust Shaft is configured at the top with a 14 ft- (4.3 m-) diameter duct that diverts air into the exhaust filtration system or to the atmosphere, as appropriate. The Salt Handling and

Air Intake Shaft collars are open except for the headframes. Rainfall into the shafts is evaporated by ventilation air.

M2-2a(3) Subsurface Structures

The subsurface structures in the repository, located at 2,150 ft (655 m) below the surface, include the HWDUs, the northern experimental areas, and the support areas. Appendix D3 of the WIPP RCRA Part B Permit Application (DOE, 1997) provided details of the underground layout. Figure M2-8 shows the proposed waste emplacement configuration for the HWDUs.

The status of important underground equipment, including fixed fire-protection systems, the ventilation system, and contamination detection systems, will be monitored by a central monitoring system, located in the Support Building adjacent to the WHB. Backup power will be provided as discussed in Permit Attachment E. The subsurface support areas are constructed and maintained to conform to Federal mine safety codes.

Underground Hazardous Waste Disposal Units (HWDUs)

During the initial term of this Permit, the volume of CH TRU mixed waste emplaced in the repository will not exceed ~~4,187,000~~ 4,635,050 ft^3 (~~118,500~~ 131,250 m^3) and the volume of RH TRU mixed waste shall not exceed 114,750 ft^3 (3,250 m^3). ~~Waste~~ CH TRU mixed waste will be disposed of in up to 7 Underground HWDUs identified as Panels 1 through 7. RH TRU mixed waste may be disposed of in Panels 3 through 7.

Main entries and cross cuts in the repository provide access and ventilation to the HWDUs. The main entries link the shaft pillar/service area with the TRU mixed waste management area and are separated by pillars. Normal entries are 12 ft (3.7 m) to 13 ft (4.0 m) high and 14 ft (4.3 m) to 16 ft (4.9) wide. Each of the Underground HWDUs labeled Panels 1 through 7 will have seven rooms. The locations of these HWDUs are shown in Figure M2-1. The rooms will have nominal dimensions of 13 ft (4.0 m) high by 33 ft (10 m) wide by 300 ft (91 m) long and will be supported by 100 ft- (30 m-) wide pillars.

As currently planned, future Permits may allow disposal of TRU mixed waste containers in three additional panels, identified as Panels 8, 9, and 10. Disposal of TRU mixed waste in Panels 8, 9, and 10 is prohibited under this Permit. If waste volumes disposed of in the eight panels fail to reach the stated design capacity, the Permittees may request a Permit to allow disposal of TRU mixed waste in the four main entries and crosscuts adjacent to the waste panels (referred to as the disposal area access drifts). These areas are labeled Panels 9 and 10 in Figure M2-1. This Permit allows only the construction of Panels 9 and 10 and prohibits disposal of TRU mixed waste in Panels 9 and 10. A permit modification or future permit would be submitted describing the condition of those drifts and the controls exercised for personnel safety and environmental protection while disposing of waste in these areas. These areas have the following nominal dimensions:

E-300 will be mined to be 14 ft (4.3 m) to 16 ft (4.9 m) wide and 12 ft (3.7 m) to 13 ft (4.0 m) high
E-140 is mined to 25 ft (7.6 m) wide by 13 ft (4 m) high
W-030 and W-170 will be similar to E-300.

All extend from S-1600 to S-3650 (i.e., 2050 ft long [625 m]). Crosscuts (east-west entries) will be 20 ft (6.1 m) wide by 13 ft (4 m) high by 470 ft (143 m) long. The layout of these excavations is shown on Figure M2-1.

Panel 1 is the first HWMU to be used for waste disposal and was excavated from 1986 through 1988. The panels may be mined in the following order:

Panel 10 (disposal area access drift)
Panel 2
Panel 9 (disposal area access drift)
Panel 3
Panel 4
Panel 5
Panel 6
Panel 7
Panel 8

Underground Facilities Ventilation System

The underground facilities ventilation system will provide a safe and suitable environment for underground operations during normal WIPP facility operations. The underground system is designed to provide control of potential airborne contaminants in the event of an accidental release or an underground fire.

The main underground ventilation system is divided into four separate flows (Figure M2-9): one flow serving the mining areas, one serving the northern experimental areas, one serving the disposal areas, and one serving the Waste Shaft and station area. The four main airflows are recombined near the bottom of the Exhaust Shaft, which serves as a common exhaust route from the underground level to the surface.

Underground Ventilation System Description

The underground ventilation system consists of six centrifugal exhaust fans, two identical HEPA-filter assemblies arranged in parallel, isolation dampers, a filter bypass arrangement, and associated ductwork. The six fans, connected by the ductwork to the underground exhaust shaft so that they can independently draw air through the Exhaust Shaft, are divided into two groups. One group consists of three main exhaust fans, two of which are utilized to provide the nominal air flow of 425,000 standard ft^3 per min (SCFM) throughout the WIPP facility underground during normal operation. One main fan may be operated in the alternate mode to provide 260,000 SCFM underground ventilation flow. These fans are located near the Exhaust Shaft. The second group consists of the remaining three filtration fans, and each can provide 60,000 SCFM of air flow. These fans, located at the Exhaust Filter Building, are capable of being employed during the filtration mode, where exhaust is diverted through HEPA filters, or in the reduced or minimum ventilation mode where air is not drawn through the HEPA filters. In order to ensure the miscellaneous unit environmental performance standards are met, a minimum running annual average exhaust rate of 260,000 SCFM will be maintained.

The underground mine ventilation is designed to supply sufficient quantities of air to all areas of the repository. During normal operating mode (simultaneous mining and waste emplacement operations), approximately 140,000 actual ft^3 (3,962 m^3) per min can be supplied to the panel area. This quantity is necessary in order to support the level of activity and the pieces of diesel equipment that are expected to be in operation.

At any given time during waste emplacement activities, there ~~will~~ may be ~~a~~ significant ~~level of activity~~ activities in ~~one room that will be receiving CH waste containers~~ multiple rooms in a panel. For example, one room may be receiving CH TRU mixed waste containers, another room may be receiving RH TRU mixed waste canisters, and the drilling of RH TRU mixed waste emplacement boreholes may be occurring in another room. The remaining rooms in a panel will either be completely filled with waste; be idle, awaiting waste handling operations; or being prepared for waste receipt. A minimum ventilation rate of 35,000 ft^3 (990 m^3) per minute will be maintained in each ~~active~~ room where waste disposal is taking place when workers are present in the room. This quantity of air is required to support the numbers and types of diesel equipment that are expected to be in operation in the area, to support the underground personnel working in that area, and to exceed a minimum air velocity of 60 ft (18 m) per minute as specified in the WIPP Ventilation Plan. The remainder of the air is needed in order to account for air leakage through inactive rooms.

Air will be routed into a panel from the intake side. Air is routed through the individual rooms within a panel using underground bulkheads and air regulators. Bulkheads are constructed by erecting framing of rectangular steel tubing and screwing galvanized sheet metal to the framing. Bulkhead members use telescoping extensions that are attached to framing and the salt which adjust to creep. Rubber or sheet metal attached to the bulkhead on one side and the salt on the other completes the seal of the ventilation. Where controlled airflow is required, a louver-style damper on a slide-gate (sliding panel) regulator is installed on the bulkhead. Personnel access is available through most bulkheads, and vehicular access is possible through selected bulkheads. Vehicle roll-up doors in the panel areas are not equipped with warning bells or strobe lights since these doors are to be used for limited periodic maintenance activities in the return air path. Flow is also controlled using brattice cloth barricades. These consist of chainlink fence that is bolted to the salt and covered with brattice cloth; and are used in instances where the only flow control requirement is to block the air. A brattice cloth air barricade is shown in Figure M2-11. Ventilation will be maintained only in all active rooms within a panel until waste emplacement activities are completed and the panel-closure system is installed. The air will be routed simultaneously through all the active rooms within the panel. The rooms that are filled with waste will be isolated from the ventilation system, while the rooms that are actively being filled will receive a minimum of 35,000 SCFM of air when workers are present to assure worker safety. After all rooms within a panel are filled, the panel will be closed using a closure system described Permit Attachment I and Permit Attachment I1.

Once a disposal room is filled and is no longer needed for emplacement activities, it will be barricaded against entry and isolated from the mine ventilation system by removing the air regulator bulkhead and constructing chain link/brattice cloth barricades at each end. There is no requirement for air for these rooms since personnel and/or equipment will not be in these areas.

The ventilation path for the waste disposal side is separated from the mining side by means of air locks, bulkheads, and salt pillars. A pressure differential is maintained between the mining side and the waste disposal side to ensure that any leakage is towards the disposal side. The pressure differential is produced by the surface fans in conjunction with the underground air regulators.

Underground Ventilation Modes of Operation

The underground ventilation system is designed to perform under two types of operation: normal (the HEPA exhaust filtration system is bypassed), and filtered (the exhaust is filtered through the HEPA filtration system, if radioactive contaminants are detected or suspected.

Overall, there are six possible modes of exhaust fan operation:

- 2 main fans in operation
- 1 main fan in operation
- 1 filtration fan in filtered operation
- 1 filtration fan in unfiltered operation
- 2 filtration fans in unfiltered operation
- 1 main and 1 filtration fan (unfiltered) in operation

Under some circumstances (such as power outages and maintenance activities, etc.), all mine ventilation may be discontinued for short periods of time.

In the normal mode, two main surface exhaust fans, located near the Exhaust Shaft, will provide continuous ventilation of the underground areas. All underground flows join at the bottom of the Exhaust Shaft before discharge to the atmosphere.

Outside air will be supplied to the mining areas and the waste disposal areas through the Air Intake Shaft, the Salt Handling Shaft, and access entries. A small quantity of outside air will flow down the Waste Shaft to ventilate the Waste Shaft station. The ventilation system is designed to operate with the Air Intake Shaft as the primary source of fresh air. Under these circumstances, sufficient air will be available to simultaneously conduct all underground operations (e.g., waste handling, mining, experimentation, and support). Ventilation may be supplied by operating one main exhaust fan, or one or two filtration exhaust fans, or an combination of the three.

If the nominal flow of 425,000 cfm (12,028 m^3/min) is not available (i.e., only one of the main ventilation fans is available) underground operations may proceed, but the number of activities that can be performed in parallel may be limited depending on the quantity of air available. Ventilation may be supplied by operating one or two of the filtration exhaust fans. To accomplish this, the isolation dampers will be opened, which will permit air to flow from the main exhaust duct to the filter outlet plenum. The filtration fans may also be operated to bypass the HEPA plenum. The isolation dampers of the filtration exhaust fan(s) to be employed will be opened, and the selected fan(s) will be switched on. In this mode, underground operations will be limited, because filtration exhaust fans cannot provide sufficient airflow to support the use of diesel equipment.

In the filtration mode, the exhaust air will pass through two identical filter assemblies, with only one of the three Exhaust Filter Building filtration fans operating (all other fans are stopped). This system provides a means for removing the airborne particulates that may contain radioactive and hazardous waste contaminants in the reduced exhaust flow before they are discharged through the exhaust stack to the atmosphere. The filtration mode is activated manually or automatically if the radiation monitoring system detects abnormally high concentrations of airborne radioactive particulates (an alarm is received from the continuous air monitor in the exhaust drift of the active waste panel) or a waste handling incident with the potential for a waste container breach is observed. The filtration mode is not initiated by the release of gases such as VOCs.

Underground Ventilation Normal Mode Redundancy

The underground ventilation system has been provided redundancy in normal ventilation mode by the addition of a third main fan. Ductwork leading to that new fan ties into the existing main exhaust duct. Documentation for this addition of a third fan and associated ductwork will be submitted to NMED before receipt of TRU mixed waste.

Electrical System

The WIPP facility uses electrical power (utility power) supplied by the regional electric utility company. If there is a loss of utility power, TRU mixed waste handling and related operations will cease.

Backup, alternating current power will be provided on site by two 1,100-kilowatt diesel generators. These units provide 480-volt power with a high degree of reliability. Each of the diesel generators can carry predetermined equipment loads while maintaining additional power reserves. Predetermined loads include lighting and ventilation for underground facilities, lighting and ventilation for the TRU mixed waste handling areas, and the Air Intake Shaft hoist. The diesel generator can be brought on line within 30 minutes either manually or from the control panel in the Central Monitoring Room (CMR).

Uninterruptible power supply units are also on line providing power to predetermined monitoring systems. These systems ensure that the power to the radiation detection system for airborne contamination, the local processing units, the computer room, and the CMR will always be available, even during the interval between the loss of off-site power and initiation of backup diesel generator power.

M2-2a(4) RH TRU Mixed Waste Handling Equipment

The following are the major pieces of equipment used to manage RH TRU mixed waste in the geologic repository. A summary of equipment capacities is included in Table M2-3.

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 conveyance and is then transported underground. At the underground waste shaft station, the Facility Cask Transfer Car proceeds away from the waste hoist 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 and is lowered to the waste shaft station underground. At the waste shaft station underground, the facility cask is moved from the waste hoist 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.

Shield plugs (29 in. (73 cm) in diameter) are inserted into the borehole (30 in. (75 cm) in diameter) after emplacement of the canister (approximately 26 in. (65 cm) in diameter). They provide the necessary shielding for the exposed end of the borehole, 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.

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 deck, where the loaded facility pallet will be transferred to the waste hoist, 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 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, and the facility pallet will be transferred from the waste hoist 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.

Once a waste panel is mined and any initial ground control established, flow regulators will be constructed to assure adequate control over ventilation during waste emplacement activities. The first room to be filled with waste will be Room 7, which is the one that is farthest from the main access ways. A ventilation control point will be established for Room 7 just outside the exhaust side of Room 6. This ventilation control point will consist of a bulkhead with a ventilation regulator. When RH TRU mixed waste canister emplacement is completed in a room, CH TRU mixed waste emplacement can begin in that room. Stacking of CH waste will begin at the ventilation control point and proceed down the access drift, through the room and up the intake access drift until the entrance of Room 6 is reached. At that point, a brattice cloth and chain link barricade will be emplaced. This process will be repeated for Room 6, and so on until Room 1 is filled. At that point, the panel closure system will be constructed.

The emplacement of CH TRU mixed waste into the HWDUs will typically be in the order received and unloaded from the Contact Handled Packaging. There is no specification for the amount of space to be maintained between the waste containers themselves, or between the waste containers and the walls. Containers will be stacked in the best manner to provide stability for the stack (which is up to three containers high) and to make best use of available space. It is anticipated that the space between the wall and the container could be from 8 to 18 in. (20 to 46 cm). This space is a function of disposal room wall irregularities, container type, and sequence of emplacement. Bags of backfill will occupy some of this space. Space is required over the stacks of containers to assure adequate ventilation for waste handling operations. A minimum of 16 in. (41 cm) was specified in the Final Design Validation Report (Appendix D1, Chapter 12 of the WIPP RCRA Part B Permit Application (DOE, 1997)) to maintain air flow. Typically, the space above a stack of containers will be 36 to 48 in. (90 to 122 cm). However 18 in. (0.45 m) will contain backfill material consisting of bags of Magnesium Oxide (MgO). Figure M2-8 shows a typical container configuration, although this figure does not mix containers on any row. Such mixing, while inefficient, will be allowed to assure timely movement of waste into the underground. No aisle space will be maintained for personnel access to emplaced waste containers. No roof maintenance behind stacks of waste is planned.

The anticipated schedule for the filling of each of the Underground HWDUs known as Panels 1 through 7 is shown in Permit Attachment I, Table I-1. Panel closure in accordance with the Closure Plan in Permit Attachment I and Permit Attachment I1 is estimated to require an additional 150 days.

Figure M2-12 is a flow diagram of the CH TRU mixed waste handling process.

M2-3 Waste Characterization

TRU mixed waste characterization is described in Permit Attachment B.

M2-4 Treatment Effectiveness

TRU mixed waste treatment, as defined in 20.4.1.101 NMAC (incorporating 40 CFR §260.10), for which a permit is required, will not be performed at the WIPP facility.

M2-5 Maintenance, Monitoring, and Inspection

M2-5a Maintenance

M2-5a(1) Ground-Control Program

The ground-control program at the WIPP facility will ensure that any room in an HWDU in which waste will be placed will be sufficiently supported to assure compliance with the applicable portions of the Land Withdrawal Act (**LWA**), which requires a regular review of roof-support plans and practices by the Mine Safety and Health Administration (**MSHA**). Support is installed to the requirements of 30 CFR §57, Subpart B.

M2-5b Monitoring

M2-5b(1) Groundwater Monitoring

Groundwater monitoring for the WIPP Underground HWDUs will be conducted in accordance with Module V and Permit Attachment L of this permit.

M2-5b(2) Geomechanical Monitoring

The geomechanical monitoring program at the WIPP facility is an integral part of the ground-control program (See Figure M2-13). HWDUs, drifts, and geomechanical test rooms will be monitored to provide confirmation of structural integrity. Geomechanical data on the performance of the repository shafts and excavated areas will be collected as part of the geotechnical field-monitoring program. The results of the geotechnical investigations will be reported annually. The report will describe monitoring programs and geomechanical data collected during the previous year.

M2-5b(2)(a) Description of the Geomechanical Monitoring System

The Geomechanical Monitoring System (**GMS**) provides in situ data to support the continuous assessment of the design for underground facilities. Specifically, the GMS provides for:

- Early detection of conditions that could affect operational safety
- Evaluation of disposal room closure that ensures adequate access
- Guidance for design modifications and remedial actions
- Data for interpreting the behavior of underground openings, in comparison with established design criteria

The instrumentation in Table M2-2 is available for use in support of the geomechanical program.

The minimum instrumentation for each of the eight panels will be one borehole extensometer installed in the roof at the center of each disposal room. The roof extensometers will monitor the 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 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.

References

DOE, 1997. Resource Conservation and Recovery Act Part B Permit Application, Waste Isolation Pilot Plant (WIPP), Carlsbad, New Mexico, Revision 6.5, 1997.

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TABLES

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TABLE M2-1
CH TRU MIXED WASTE HANDLING EQUIPMENT CAPACITIES

CAPACITIES FOR EQUIPMENT	
Facility Pallet	25,000 lbs.
Facility Transfer Vehicle	26,000 lbs.
Underground transporter	28,000 lbs.
Underground fork lift	12,000 lbs.
MAXIMUM GROSS WEIGHTS OF CONTAINERS	
Seven-pack of 55-gallon drums	7,000 lbs.
Four-pack of 85-gallon drums	4,500 lbs.
Three-pack of 100-gallon drums	3,000 lbs.
Ten-drum overpack	6,700 lbs.
Standard waste box	4,000 lbs.
MAXIMUM NET EMPTY WEIGHTS OF EQUIPMENT	
TRUPACT-II	13,140 lbs.
HalfPACT	10,5000 lbs. ~~TRUPACT-IIs~~
Facility pallet	4,120 lbs.

TABLE M2-2
INSTRUMENTATION USED IN SUPPORT OF THE GEOMECHANICAL MONITORING SYSTEM

INSTRUMENT TYPE	FEATURES	PARAMETER MEASURED	RANGE
Borehole Extensometer	The extensometer provides for monitoring the deformation parallel to the borehole axis. Units suitable for up to 5 measurements anchors in addition to the reference head. Maximum borehole depths shall be 50 feet.	Cumulative Deformation	0-2 inches
Borehole Television Camera	Closed circuit television may be used for monitoring areas otherwise inaccessible, such as boreholes or shafts.	Video Image	N/A
Convergence Points and Tape Extensometers	Mechanically anchored eyebolts to which a portable tape extensometer is attached.	Cumulative Deformation	2-50 feet
Convergence Meters	Includes wire and sonic meters. Mounted on rigid plates anchored to the rock surface.	Cumulative Deformation	2-50 feet
Inclinometers	Both vertical and horizontal inclinometers are used. Traversing type of system in which a probe is moved periodically through casing located in the borehole whose inclination is being measured.	Cumulative Deformation	0-30 degrees
Rock Bolt Load Cells	Spool type units suitable for use with rock bolts. Tensile stress is inferred from strain gauges mounted on the surface of the spool.	Load	0-300 kips
Earth Pressure Cells	Installed between concrete keys and rock. Preferred type is a hydraulic pressure plate connected to a vibrating wire transmitter.	Lithostatic Pressure	0-1000 psi
Piezometer Pressure Transducers	Located in shafts and of robust design and construction. Periodic checks on operability required.	Fluid Pressure	0-500 psi
Strain Gauges	Installed within the concrete shaft key. Suitably sealed for the environment. Two types used--surface mounted and embedded.	Cumulative Deformation	0-3000 µin/in (embedded) 0-2500 µin/in (surface)

TABLE M2-3
RH TRU MIXED WASTE HANDLING EQUIPMENT CAPACITIES

CAPACITIES FOR EQUIPMENT	
41-Ton Forklift	82,000 lbs
MAXIMUM GROSS WEIGHTS OF RH TRU CONTAINERS	
RH TRU Facility Canister	10,000 lbs
55-Gallon Drum	1,000 lbs
RH TRU Canister	8,000 lbs
MAXIMUM NET EMPTY WEIGHTS OF EQUIPMENT	
Facility Cask	67,700 lbs

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FIGURES

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Figure M2-1
Repository Horizon

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

Figure M2-3
Facility Pallet for Seven-Pack of Drums

Figure M2-5
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Figure M2-5a
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Figure M2-6
Waste Transfer Cage to Transporter

Figure M2-7
Push-Pull Attachment to Forklift to Allow Handling of Waste Containers

Figure M2-8
Typical RH and CH Transuranic Mixed Waste Container Disposal Configuration

Figure M2-9
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Figure M2-11
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Figure M2-12
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Figure M2-13
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Figure M2-14
Facility Cask Transfer Car (Side View)

Figure M2-15
Horizontal Emplacement and Retrieval Equipment

Figure M2-16
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Figure M2-17
Facility Cask Installed on the Horizontal Emplacement and Retrieval Equipment

Figure M2-18
Installing Shield Plug

ATTACHMENT N

~~CONFIRMATORY~~ VOLATILE ORGANIC COMPOUND MONITORING PLAN

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ATTACHMENT N

~~CONFIRMATORY~~ VOLATILE ORGANIC COMPOUND MONITORING PLAN

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Acronyms and Abbreviations

~~BFB~~	~~4-Bromofluorobenzene~~
BS/BSD	blank spike/blank spike duplicate
CH	Contact-handled
CLP	Contract Laboratory Program
COC	concentration of concern
CRQL	contract-required quantitation limit
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	feet
~~FTIR~~	~~Fourier transform infrared spectrometry~~
~~g/mol~~	~~grams per mole~~
GC/MS	gas chromatography/mass spectrometry
HWDU	Hazardous Waste Disposal Unit
LCS	laboratory control sample
m	meter
MDL	method detection limit
MOC	Management and Operating Contractor (Permit Condition I.D.3)
MRL	method reporting limit
NIST	National Institute of Standards and Testing
~~NMAC~~	~~New Mexico Administrative Code~~
ppbv	parts per billion by volume
QA	quality assurance
QAPD	Quality Assurance Program Description
~~QAPjP~~	~~Quality Assurance Project Plan~~
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SOP	standard operating procedure
~~SOW~~	~~statement of work~~
TIC	tentatively identified compound
TRU	Transuranic
VOC	volatile organic compound

WIPP	Waste Isolation Pilot Plant

ATTACHMENT N

~~CONFIRMATORY~~ VOLATILE ORGANIC COMPOUND MONITORING PLAN

N-1 Introduction

This Permit Attachment describes the ~~confirmatory~~ monitoring plan for volatile organic compound (**VOC**) emissions from mixed waste that may be entrained in the exhaust air from the U.S. Department of Energy (**DOE**) Waste Isolation Pilot Plant (**WIPP**) Underground Hazardous Waste Disposal Units (**HWDUs**) during the disposal phase at the facility. The purpose of ~~the confirmatory~~ VOC monitoring is to ensure compliance with ~~confirm that the concentrations of VOCs in the emissions from the Underground HWDUs do not exceed~~ the VOC ~~room-based~~ limits specified in Permit Module IV. This VOC monitoring plan consists of two programs as follows; (1) Repository VOC Monitoring, which assesses compliance with the environmental performance standards in Table IV.F.2.c; and (2) Disposal Room VOC Monitoring, which assesses compliance with the disposal room performance standards in Table IV.F.3.b. ~~Implementation of this plan ensures compliance with the disposal room performance standards as directed by Section 311 of Public Law (P.L.) 108-137 and Section 310 of Public Law 108-147.~~ This plan includes the monitoring design, a description of sampling and analysis procedures, quality assurance (**QA**) objectives, and reporting activities.

N-1a Background

The Underground HWDUs are located 2,150 feet (ft) (655 meters [m]) below ground surface, in the WIPP underground. As defined for this Permit, an Underground HWDU is a single excavated panel consisting of seven rooms and two access drifts designated for disposal of contact-handled (**CH**) and remote-handled (**RH**) transuranic (**TRU**) mixed waste. Each room is approximately 300 ft (91 m) long, 33 ft (10 m) wide, and 13 ft (4 m) high. Access drifts connect the rooms and have the same cross section. The Permittees shall dispose of TRU mixed waste in Underground HWDUs designated as Panels 1 through 7.

This plan addresses the following elements:

1. Rationale for the design of the VOC monitoring programs, based on:

    - Possible pathways from WIPP during the active life of the facility
    - Demonstrating compliance with the disposal room performance standards by monitoring VOCs in underground disposal rooms
    - VOC sampling operations at WIPP
    - Optimum location of the ambient mine air monitoring stations

2. Descriptions of the specific elements of the VOC monitoring programs, including:

    - The type of monitoring conducted
    - The location of the monitoring stations
    - The monitoring interval

- The specific hazardous constituents monitored
- The implementation schedule for the VOC monitoring programs
- The equipment used at the monitoring stations
- Sampling and analytical techniques used
- Data recording/reporting procedures
- Action levels for remedial action if limits are approached

The results of baseline VOC monitoring at WIPP were used, in part, to define the ~~confirmatory~~ VOC monitoring programs ~~that will be established for the Disposal Phase, during which full-scale waste emplacement activities will occur~~. The baseline VOC monitoring results were presented in Appendix D21 of the WIPP Resource Conservation Recovery Act (**RCRA**) Part B Permit Application (DOE, 1997). These data represent the anticipated background levels of VOCs during operations at WIPP. The technical basis for Disposal Room VOC Monitoring is discussed in detail in the Technical Evaluation Report for Room-Based VOC Monitoring (WRES, 2003).

N-1b Objectives of the ~~Confirmatory~~ Volatile Organic Compound Monitoring Plan

The CH and RH TRU mixed waste disposed in the WIPP Underground HWDUs contain VOCs which could be released from ~~open and closed panels located at~~ WIPP during the disposal phase of the project. This plan describes how:

- VOCs released from waste panels will be monitored to confirm that the annual average concentration of VOCs in the air emissions from the Underground HWDUs do not exceed the VOC concentrations of concern (**COC**) ~~listed in Table N-2.~~ identified in Permit Module IV, Table IV.F.2.c. Appropriate remedial action, as specified in Permit Condition IV.F.2.d, will be taken if the limits in Permit Module IV, Table IV.F.2.c are reached.

- VOCs released from waste containers in disposal rooms will be monitored to confirm that the concentration of VOCs in the air of closed and active rooms in active panels do not exceed the VOC disposal room limits identified in Permit Module IV, Table IV.D.1. Appropriate remedial action, as specified in Permit Condition IV.F.3.c, will be taken if the Action Levels in Permit Module IV, Table IV.F.3.b are reached.

N-2 Target Volatile Organic Compounds

The target VOCs for repository monitoring (Station VOC-A and VOC-B) and disposal room monitoring presented in Table N-1. ~~this sampling plan will be as follows:~~

- ~~Carbon tetrachloride~~
- ~~Chlorobenzene~~
- ~~Chloroform~~
- ~~1,1-Dichloroethylene~~
- ~~1,2-Dichloroethane~~
- ~~Methylene chloride~~
- ~~1,1,2,2-Tetrachloroethane~~

- ~~Toluene~~
- ~~1,1,1-Trichloroethane~~

These target VOCs were selected because together they represent approximately 99 percent of the risk due to air emissions. ~~Physical and chemical data for these target VOCs for confirmatory air monitoring are presented in Table N-1.~~

N-3 Monitoring Design

Detailed design features of this plan are presented in this section. This plan uses available sampling and analysis techniques to measure VOC concentrations in air. ~~Available sampling~~ Sampling equipment includes the WIPP VOC canister samplers both the Repository and Disposal Room VOC Monitoring Programs.

N-3a Sampling Locations

Air samples will be collected in the underground to quantify airborne VOC concentrations as described in the following sections.

N-3a(1) Sampling Locations for Repository VOC Monitoring

The initial configuration for the ~~confirmatory~~ repository VOC monitoring stations is shown in Figure N-1. All mine ventilation air which could potentially be impacted by VOC emissions from the Underground HWDUs identified as Panels 1 through 7 will pass monitoring Station VOC-A, located in the E-300 drift as it flows to the exhaust shaft. Air samples will be collected at two locations in the facility to quantify airborne VOC concentrations. VOC concentrations attributable to VOC emissions from open and closed panels containing CH TRU mixed waste will be measured by placing one VOC monitoring station just downstream from Panel 1 at VOC-A. The location of Station VOC-A will remain the same throughout the term of this Permit. The second station (Station VOC-B) will always be located upstream from the open panel being filled with waste (starting with Panel 1 at monitoring Station VOC-B (Figure N-1). In this configuration, Station VOC-B will measure VOC concentrations attributable to releases from the upstream sources and other background sources of VOCs, but not releases attributable to open or closed panels. The location of Station VOC-B will change when disposal activities begin in the next panel. Station VOC-B will be relocated to ensure that it is always upstream of the open panel that is receiving TRU mixed waste. Station VOC-A will also measure upstream VOC concentrations measured at Station VOC-B, plus any additional VOC concentrations resulting from releases from the closed and open panels. A sample will be collected from each monitoring station on designated sample days. For each quantified target VOC, the concentration measured at Station VOC-B will be subtracted from the concentration measured at Station VOC-A to assess the magnitude of VOC releases from closed and open panels.

The sampling locations were selected based on operational considerations. There are several different potential sources of release for VOCs into the WIPP mine ventilation air. These sources include incoming air from above ground and facility support operations, as well as open and closed waste panels. In addition, because of the ventilation requirements of the underground facility and atmospheric dispersion characteristics, any VOCs that are released open or closed panels may be difficult to detect and differentiate from other sources of VOCs at any underground or above ground location further downstream of Panel 1. By measuring VOC concentrations close to the potential source of release (i.e., at Station VOC-A), it will be possible to differentiate potential releases from background levels (measured at Station VOC-B).

N-3a(2) Sampling Locations for Disposal Room VOC Monitoring

For purposes of compliance with the Section 311 of Public Law 108-137 and Section 310 of Public Law 108-447, the VOC monitoring of airborne VOCs in underground disposal rooms in which waste has been emplaced will be performed as follows:

1. A sample head will be installed inside the disposal room behind the exhaust drift bulkhead and at the inlet side of the disposal room.

2. TRU mixed waste will be emplaced in the active disposal room.

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-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. ~~Other compounds may also be present in the samples.~~ As part of the analytical evaluations, the presence of other compounds will be investigated. ~~The analytical method will allow semiquantitative evaluation of these compounds as tentatively identified compounds.~~ The analytical laboratory will be directed to classify these compounds as Tentatively Identified Compounds (**TICs**). TICs detected in 25% or more of the repository VOC monitoring samples collected over a 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 Annual VOC Monitoring Report as specified in Permit Condition IV.F.2.b.

N-3c Sampling and Analysis Methods

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

The method~~ that will be~~ 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-14A (EPA, 1997)~~ TO-15 (EPA, 1999). The TO-1~~4A~~5 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-1~~4A~~5 and 8260B~~ the draft *EPA Contract Laboratory Program - Statement of Work* (**CLP-SOW**) *for Volatile Organics Analysis of Ambient Air in Canisters* (EPA, 1994)~~. Section N-5 contains additional QA/QC information for this project.

The TO-1~~4A~~5 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 passivation process forms a pure chrome-nickel oxide on the interior surfaces of the canisters.~~ 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~~ Confirmatory~~ 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**)~~ proposed by the EPA in the CLP-SOW~~ are 5 parts per billion by volume (**ppbv**) or less for the nine target compounds~~ (EPA, 1994)~~. 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.

~~Alternative sampling methods will be considered for deployment. One option will be to use subatmospheric samplers rather than pressurized sampling systems for stations VOC-A and VOC-B. In addition, remote sensing by proposed draft EPA Method TO-16, open-path fourier transform infrared spectrometry (**FTIR**) and extractive FTIR, may constitute supplemental or alternative methods for detecting VOCs released from waste panels at WIPP. WIPP personnel will continue to follow the development of emerging FTIR technology, and other potentially applicable technologies for assessing VOCs in the WIPP environment. Real-time monitoring with an FTIR system may be a feasible future option for the VOC Confirmatory Monitoring Program. If the Permittees determine that an alternate sampling technique is appropriate, the Permittees will submit a request for a Permit modification to the Secretary for review and approval. The Permit modification request will include a revised confirmatory VOC monitoring plan.~~

Disposal room VOC monitoring system 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

~~Confirmatory~~ 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 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.

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-5e. 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 ~~Table N-2~~. The values are presented in terms of micrograms per cubic meter (µg/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:

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

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 ~~Table N-2~~. 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 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 ~~Table N-2~~.

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) ~~wording~~ working 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 ~~Table N-2~~.

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 three (3) working 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 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 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,~~ and~~ 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-1~~4A~~5~~ and the draft EPA CLP-SOW for Analysis of Ambient Air in Canisters (EPA, 1994)~~. The canisters will be certified clean to below the required reporting limits for the VOC analytical method for the target VOCs (see Table N-~~4~~2). The vacuum of certified clean samplers will be verified at the sampler upon initiation of a sample cycle.

N-4a(2) Volatile Organic Compound Canister Samplers

A conceptual diagram of a VOC sample collection unit is provided in Figure N-2.~~ Two such systems, located~~ Such units will be used at monitoring Stations VOC-A and VOC-B~~, will be operational at the time waste disposal operations begin in Panel 1~~ and at sampling locations for disposal room measurements. The sampling~~ system~~ unit consists of a sample pump, flow controller, sample inlet,~~ two~~ inlet filters in series to remove particulate matter, vacuum/pressure gauge, electronic timer, inlet purge vent, two sampling ports, and sufficient collection canisters so that any delays attributed to laboratory turnaround time and canister cleaning and certification will not result in canister shortages. Knowledge of sampler flow rates and duration of sampling will allow calculation of sample volume. The set point flow rate will be verified before and after sample collection from the mass flow indication. Prior to their initial use and annually thereafter, the sample collection units will be tested and certified to demonstrate that they are free of contamination above the reporting limits of the VOC analytical method (see Section N-5). Ultra-high purity humidified zero air will be pumped through the inlet line and sampling unit and collected in previously certified canisters as sampler blanks for analysis. The cleaning and certification procedure is derived from concepts contained in the EPA Compendium Method~~ TO-14A (EPA, 1997)~~ TO-15 (EPA, 1999).

N-4a(3) Sample Tubing

Treated stainless steel tubing is used as a sample path, from the desired sample point to the sample collection unit. This tubing is treated to prevent the inner walls from absorbing contaminants when they are pulled from the sample point to the sample collection unit.

N-4b Sample Collection

Six-hour integrated samples will be collected on each sample day. Alternative sampling durations may be defined for experimental purposes. The VOC canister sampler at each location will sample ambient air on the same programmed schedule. The sample pump will be programmed to sample continuously over a six-hour period during the workday. The units will sample at a nominal flow rate of 33.3 actual milliliters per minute over a six-hour sample period. This schedule will yield a final sample volume of approximately 12 L. Flow rates and sampling duration may be modified as necessary for experimental purposes and to meet the data quality objectives.

Sample flow will be checked each sample day using an in-line mass flow controller. The flow controllers are initially factory-calibrated and specify a typical accuracy of better than 10 percent full scale. Additionally, each air flow controller is calibrated at a manufacturer-specified frequency using a National Institute of Standards and Testing (NIST) primary flow standard.

Upon initiation of waste disposal activities in Panel 1, samples will be collected twice each week (at Stations VOC-A and VOC-B). Samples collected at the panel locations should represent the same matrix type (i.e., elevated levels of salt aerosols). To verify the matrix similarity and assess field sampling precision, field duplicate samples will be collected (two canisters filled simultaneously by the same sampler) from each sampling station (Stations VOC-A and VOC-B) during the first sampling event and at an overall frequency of 5 percent thereafter (see Section N-5a).

Prior to collecting the active open disposal room and closed room samples, the sample lines are purged to ensure that the air collected is not air that has been stagnant in the tubing. This is important in regard to the disposal room sample particularly because of the long lengths of tubing associated with these samples. The repository samples do not require this action due to the short lengths of tubing required at these locations.

N-4c Sample Management

Field sampling data sheets will be used to document the sampler conditions under which each sample is collected. These data sheets have been developed specifically for VOC monitoring at the WIPP facility. The individuals assigned to collect the specific samples will be required to fill in all of the appropriate sample data and to maintain this record in sample logbooks. The program team leader will review these forms for each sampling event.

All sample containers will be marked with identification at the time of collection of the sample. A Request-for-Analysis Form ~~(Figure N-3)~~ will be completed to identify the sample canister number(s), sample type and type of analysis requested.

All samples will be maintained, and shipped if necessary, at ambient temperatures. Collected samples will be transported in appropriate containers. Prior to leaving the underground for analysis, sample containers may undergo radiological screening. No potentially contaminated samples or equipment will be transported to the surface. No samples will be accepted by the receiving laboratory personnel unless they are properly labeled and sealed to ensure a tamper free shipment.

An important component of the sampling program is a demonstration that collected samples were obtained from the locations stated and that they reached the laboratory without alteration. To satisfy this requirement, evidence of collection, shipment, laboratory receipt, and custody will be documented with a completed Chain-of-Custody Form (Figure N-4). Chain-of-custody procedures will be followed closely, and additional requirements imposed by the laboratory for sample analysis will be included as necessary.

Individuals collecting samples will be responsible for the initiation of custody procedures. The chain of custody will include documentation as to the canister certification, location of sampling event, time, date, and individual handling the samples. Deviations from procedure will be considered variances. Variances must be preapproved by the program manager and recorded in the project files. Unintentional deviations, sampler malfunctions, and other problems are nonconformances. Nonconformances must be documented and recorded in the project files. All field logbooks/data sheets must be incorporated into WIPP's records management program.

N-4d Sampler Maintenance

Periodic maintenance for canister samplers and associated equipment will be performed during each cleaning cycle. This maintenance will include, but not be limited to, replacement of damaged or malfunctioning parts without compromising the integrity of the sampler, leak testing, and instrument calibration. Additionally, complete spare units will be maintained on-site to minimize downtime because of sampler malfunction. At a minimum, canister samplers will be certified for cleanliness initially and annually thereafter upon initial use, after any parts that are 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-14A (EPA, 1997)~~ TO-15 (EPA, 1999) and in SW-846 Method 8260B (EPA 1996) ~~the draft CLP-SOW for Analysis of Ambient Air (EPA, 1994). The technical approach for canister sample analysis is summarized below~~.

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-4e(1) Sample Preparation~~

~~Because canisters will be pressurized during the sampling procedure, laboratory pressurization will not normally be necessary for analyses. Canister pressures will be verified by the laboratory when they are received to confirm that significant losses did not take place during shipping and storage.~~

~~N-4e(2) Analytical System Requirements~~

~~The GC/MS analytical system will consist of three major components: the sample introduction system, the analyte separation system (**GC**), and the analyte detector system (**MS**).~~

- ~~Sample Introduction System for Canisters: This system may include a drying tube to remove moisture from the gas stream. One or more cryogenic traps may be used to focus and desorb trapped material. Transfer lines within the introduction unit will be heated as necessary so that volatile compounds are not actively adsorbed. Valves and solenoids will be heated and of a low dead volume type. The introduction system will have an in-line mass flow controller. The introduction unit will be capable of introducing internal standards directly into the sample flow path.~~

- ~~Analyte Separation: Analyte separation will be achieved by GC. The GC will be capable of subambient temperature programming.~~

- ~~Detection System: Analyte detection will be accomplished by MS. The MS must be capable of scanning from 35 to 300 mass-to-charge ratio in one second or less, using 70 electron-volt electron energy in the electron impact ionization mode, and produce a mass spectrum which meets all the instrument performance acceptance criteria when 50 nanograms of 4-bromofluorobenzene (**BFB**) is analyzed. The MS must have a data system capable of continuous acquisition and storage on machine readable media storing all raw data, and a computer algorithm for analyte quantitation and forward library searching. All raw and processed GC/MS data must be stored on magnetic tape or disk and maintained as Lifetime Records (i.e., for the life of the confirmatory VOC monitoring program plus six years).~~

~~N-4e(3) Standard Preparation~~

~~Primary analytical standards will be prepared by the laboratory from commercially available, certified calibration gases. Alternatively, primary standards may be generated internally by the laboratory. Primary standards of analytes that are gases at standard temperature and pressure may be prepared internally in a static gas dilution bottle. For analytes that are liquid or solid at standard temperature and pressure, a mixture may be made and loaded directly into a standard preparation cylinder. These internally generated standards will be checked against EPA audit cylinders or other reference materials to verify the accuracy of their concentrations.~~

~~Primary standards will be prepared for the nine target compounds as well as the internal standards. Secondary standards used for instrument calibration will be prepared from dilution of the primary standards.~~

~~N-4e(4) Calibration Procedures~~

~~Prior to the analysis of a standard curve, the GC/MS system must undergo a mass calibration check. This check is performed by introducing 50 nanograms of BFB into the capillary column through the preconcentrator. The requirements (criteria) for relative ion abundances for BFB, listed in Table N-3, must be met before analyses may proceed. BFB requirements must be met for each 12 hours of operation.~~

~~Quantitative standards for the nine target analytes will be analyzed at five concentrations. These concentrations should define the linear range of the instrument for these nine compounds; however, if some nonlinearity exists, concentrations may be determined by curve fitting or physically plotting the data. One standard concentration shall be at or near a concentration corresponding to the required MRL for each target compound. Relative response factors will be generated for each target compound. These response factors must meet the requirements listed in Section N-5a(3). As discussed above, if low concentration standards do not meet the linearity requirement, a curve-fitting routine may be used. The method used to quantify the data must be reported with the analytical results. In addition, a single point calibration check will be performed for each 12 hours of analytical system operation.~~

~~N-4e(5) Library Searches~~

~~In every sample analyzed, a forward search of the NIST library of mass spectra for tentatively identified compounds must be performed for all chromatographic peaks greater than 10 percent of the nearest internal standard.~~

~~N-4e(6) Data Reporting~~

~~The laboratory will provide a data package that identifies and describes the sample analyzed, the analysis date, the analytical results, the QC check results and description of any unusual conditions encountered.~~

~~Sample target analyte concentrations will be quantified using the average relative response factor of the initial calibration standards and will be reported in ppbv. Non-target sample contaminants identified by NIST library searches will be reported as tentatively identified compounds, and concentration calculations will be based on the response of the nearest internal standard. The relative response factor used for quantitation, as well as copies of spectra with the library search results (purity and/or fit), will be submitted with the results. A table listing the run sequence with the corresponding internal standard area counts will be reported with the analytical results. A narrative describing any problems with sample analyses will be included. Any nonconformances must be included with the reporting of the data.~~

~~N-4f Laboratory Selection~~

~~Sample will be analyzed at the WIPP on-site analytical laboratory and/or at a suitable contract analytical laboratory. Upon selection of an off-site contract laboratory, the Permittees will ensure that procured services conform to specified requirements. These measures generally will include one or more of the following: (1) evaluation of the supplier's capability to provide services in accordance with requirements, including a history of providing similar services; (2) evaluation of objective evidence of conformance, such as laboratory document submittals; and (3) examination of delivered services.~~

~~If the WIPP on-site analytical laboratory is utilized to conduct the sample analyses, then duplicate samples from each sampling station (Stations VOC-A and VOC-B) will be collected at an overall frequency of 10 percent. The duplicate samples will be analyzed by an independent off-site analytical laboratory (see Section N-5a).~~

~~N-4g Laboratory Procedures~~

~~Specific laboratories that perform analyses and sampler certification activities for the Confirmatory VOC Monitoring Program are required to develop and maintain the following SOPs as appropriate:~~

- ~~Canister cleaning and certification~~
- ~~Sampler cleaning and certification~~
- ~~Analyses of VOCs in SUMMA® canisters~~
- ~~Data QA and reporting~~

~~Analytical laboratories are required to maintain an internal program QA manual, and to develop and prepare a Quality Assurance Project Plan (**QAPjP**) covering cleaning and certification of canisters and laboratory analysis of canister samples.~~

N-5 Quality Assurance

The QA activities for the ~~confirmatory~~ VOC monitoring programs will be conducted in accordance with the documents: *EPA ~~Requirements~~ Guidance for Quality Assurance Project Plans ~~for Environmental Data Operations~~ QA/G-5* (EPA, ~~1994~~ 2002), *Guidance for the Data Quality Objectives Process, QA/G-4* (EPA, 2000), and the ~~*Interim Guidelines and Specifications*~~ *EPA Requirements for Preparing Quality Assurance Project Plans, QA/R-5* (EPA, ~~1983~~ 2001). The QA criteria for the ~~confirmatory~~ VOC monitoring programs are listed in Table N-~~4~~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.

~~These data quality objectives are based on control criteria proposed by the EPA as presented in the *CLP-SOW\ for the Volatile Organics Analysis of Ambient Air in Canisters* (EPA, 1994).~~

N-5a <u>Quality Assurance Objectives for the Measurement of Precision, Accuracy, Sensitivity, and Completeness</u>

QA objectives for this plan will be defined in terms of the following data quality parameters.

Precision. For the duration of this program, precision will be defined and evaluated by the RPD values calculated between field duplicate samples and between laboratory duplicate samples.

$$RPD = \left(\frac{(A-B)}{(A+B)/2} \right) * 100 \qquad \text{(N-2)}$$

where: A = Original sample result
B = Duplicate sample result

Accuracy. Analytical accuracy will be defined and evaluated through the use of analytical standards. Because recovery standards cannot reliably be added to the sampling stream, overall system accuracy will be based on analytical instrument performance evaluation criteria. These criteria will include performance verification for instrument calibrations, laboratory control samples, sample surrogate recoveries, and sample internal standard areas. These criteria will constitute the verification of accuracy for target analyte quantitation (i.e., quantitative accuracy). Evaluation of standard ion abundance criteria for BFB will be used to evaluate the accuracy of the analytical system in the identification of targeted analytes, as well as the evaluation of unknown contaminants (i.e., qualitative accuracy).

Sensitivity. Sensitivity will be defined by the required MRLs for the program. Attainment of required MRLs will be verified by the performance of statistical method detection limit (**MDL**) studies in accordance with 40 *Code of Federal Regulations* § 136. The MDL represents the minimum concentration that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. An MDL study will be performed by the program analytical laboratory prior to sampling and analysis, and annually thereafter.

Completeness. Completeness will be defined as the percentage of the ratio of the number of valid sample results received (i.e., those which meet data quality objectives) versus the total number of samples collected. Completeness may be affected, for example, by sample loss or destruction during shipping, by laboratory sample handling errors, or by rejection of analytical data during data validation.

N-5a(1) <u>Evaluation of Laboratory Precision</u>

Laboratory sample duplicates and blank spike/blank spike duplicates (**BS/BSD**) will be used to evaluate laboratory precision. QA objectives for laboratory precision are listed in Table N-~~4~~2, and are based on precision criteria proposed by the EPA for canister sampling programs (EPA, 1994). These values will be appropriate for the evaluation of samples with little or no matrix effects. Because of the potentially high level of salt-type aerosols in the WIPP underground environment, the analytical precision achieved for WIPP samples may vary with respect to the EPA criteria. RPDs for BS/BSD analyses will be tracked through the use of control charts. RPDs obtained for laboratory sample duplicates will be compared to those obtained for BS/BSDs to ascertain any sample matrix effects on analytical precision. BS/BSDs and laboratory sample duplicates will be analyzed at a frequency of 10 percent, or one per analytical lot, whichever is more frequent.

N-5a(2) Evaluation of Field Precision

Field duplicate samples will be collected at a frequency of 5 percent for both monitoring locations. The data quality objective for field precision is 35 percent for each set of duplicate samples.

N-5a(3) Evaluation of Laboratory Accuracy

~~**Quantitative Accuracy**.~~ Quantitative analytical accuracy will be evaluated through performance criteria on the basis of (1) relative response factors generated during instrument calibration, (2) analysis of laboratory control samples (**LCS**), and (3) recovery of internal standard compounds. The criteria for the initial calibration (5-point calibration) is $\leq$ 30 percent relative standard deviation for target analytes. After the successful completion of the 5-point calibration, it is sufficient to analyze only a midpoint standard for every 12 hours of operation. The midpoint standard will pass a 30 percent difference acceptance criterion for each target compound before sample analysis may begin.

A blank spike or LCS is an internal QC sample generated by the analytical laboratory by spiking a standard air matrix (humid zero air) with a known amount of a certified reference gas. The reference gas will contain the target VOCs at known concentrations. Percent recoveries for the target VOCs will be calculated for each LCS relative to the reference concentrations. Objectives for percent recovery are listed in Table N-2, and are based on accuracy criteria proposed by the EPA for canister sampling programs (EPA, 1994). LCSs will be analyzed at a frequency of 10 percent, or one per analytical lot, whichever is more frequent.

Internal standards will be introduced into each sample analyzed, and will be monitored as a verification of stable instrument performance. In the absence of any unusual interferences, areas should not change by more than 40 percent over a 12-hour period. Deviations larger than 40 percent are an indication of a potential instrument malfunction. If an internal standard area in a given sample changes by more than 40 percent, the sample will be reanalyzed. If the 40 percent criterion is not achieved during the reanalysis, the instrument will undergo a performance check and the midpoint standard will be reanalyzed to verify proper operation. Response and recovery of internal standards will also be compared between samples, LCSs, and calibration standards to identify any matrix effects on analytical accuracy.

~~**Qualitative Accuracy**. Qualitative accuracy in the identification of target VOCs will be evaluated by the relative ion abundance criteria established for the internal standard compound BFB. For each 12 hours of sample analysis, a 50-nanogram injection of BFB must be made, and the requirements listed in Table N-3 will be met before the instrument may be used to analyze samples.~~

N-5a(d) Evaluation of Sensitivity

The presence of aerosol salts in underground locations may affect the MDL of the samples collected in those areas. The intake manifold of the sampling systems will be protected sufficiently from the underground environment to minimize salt aerosol interference.

The MDL for each of the nine target compounds will be evaluated by the analytical laboratories before sampling begins. The initial and annual MDL evaluation will be performed in accordance 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(e) 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-4~~C~~c.

N-5c Calibration Procedures and Frequency

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

~~N-5d Analytical Procedures~~

~~The analytical procedures for the Confirmatory VOC Monitoring Program, which are based on the draft *CLP-SOW for Volatile Organics Analysis of Ambient Air in Canisters* (EPA, 1994) and EPA Method TO-14A (EPA, 1997), are outlined in Section N-4e.~~

N-5~~e~~d 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.

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

Acceptable data for this VOC monitoring ~~program~~ plan will meet stated precision and accuracy criteria. The QA objectives for precision, accuracy, and completeness as shown in Table N-~~4~~2 can be achieved when established methods of analyses are used as proposed in this plan and standard sample matrices are being assessed. ~~However, because of the potential for the samples to contain high levels of salt-type aerosols, the degree to which the QA objectives for the program can be achieved is presently uncertain. The program data will be evaluated and QA objectives modified as necessary based on the results of the QC testing program. If the Permittees determine that alternate QA objectives are required, the Permittees will submit a request for a Permit modification to the Secretary for approval.~~

N-5~~f~~e 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 certification, review of laboratory qualification and operation and, at the request of the QA officer, an on-site audit of the laboratory facilities. The function of the system audit is to verify that the requirements in this plan have been met prior to initiating the program. System audits will be performed at or shortly after to the initiation of the VOC monitoring programs and on an annual basis thereafter.

Performance audits will be accomplished as necessary through the evaluation of analytical QC data by performing periodic site audits throughout the duration of the project, and through the introduction of third-party audit cylinders (laboratory blinds) into the analytical sampling stream. Performance audits will also include a surveillance/review of data associated with canister and sampler certification, a project-specific technical audit of field operations, and a laboratory performance audit. Field logs, logbooks, and data sheets will be reviewed weekly. Blind-audit canisters will be introduced once during the sampling period. Details concerning scheduling, personnel, and data quality evaluation are addressed in the QAPjP.

N-5~~g~~f Preventive Maintenance

Sampler maintenance is described briefly in Section N-4d Maintenance of analytical equipment will be addressed in the analytical SOP.

N-5~~h~~g Corrective Actions

If the required completeness of valid data (~~90~~ 95 percent) is not maintained, corrective action may be required. Corrective action for field sampling activities may include recertification and cleaning of samplers, reanalysis of samples, additional training of personnel, modification to field and laboratory procedures, and recalibration of test equipment.

Laboratory corrective actions may be required to maintain data quality. The laboratory continuing calibration criteria indicate the relative response factor for the midpoint standard will be less than 30 percent different from the mean relative response factor for the initial calibration. Differences greater than 30 percent will require recalibration of the instrument before samples can be analyzed. If the internal standard areas in a sample change by more than 40 percent, the sample will be reanalyzed. If the 40 percent criterion is not achieved during the reanalysis, the instrument will undergo a performance check and the midpoint standard reanalyzed to verify proper operation. Deviations larger than 40 percent are an indication of potential instrument malfunction.

The laboratory results for samples, duplicate analyses, LCSs, and blanks should routinely be within the QC limits. If results exceed control limits, the reason for the nonconformances and appropriate corrective action must be identified and implemented.

N-5~~i~~h Records Management

The ~~Confirmatory~~ VOC Monitoring Programs will require administration of record files (both laboratory and field data collection files). The records control systems will provide adequate control and retention for program-related information. Records administration, including QA records, will be conducted in accordance with applicable DOE, MOC, and WIPP requirements.

Unless otherwise specified, VOC monitoring ~~program~~ plan records will be retained as ~~permanent~~ 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 ~~Confirmatory~~ 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 References

U.S. Department of Energy. 1997. *Resource Conservation and Recovery Act Part B Permit Application, Waste Isolation Pilot Plant (WIPP)*, Carlsbad New Mexico, Re. 6.4, 1997

~~U.S. Environmental Protection Agency. 1983. *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*. QAMS-005/80, EPA-600/4-83-004~~

~~U.S. Environmental Protection Agency. 1994. *Draft Contract Laboratory Program Statement of Work, Volatile Organics Analysis of Ambient Air in Canisters*, EPA 540/R-94-085, December 1994, Washington, D.C.~~

~~U.S. Environmental Protection Agency. 1994. EPA QA/R-5, *Draft Interim Final, EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations,* Washington, D.C.~~

U.S. Environmental Protection Agency. 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. 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.

U.S. Environmental Protection Agency. 2000. *Guidance for the Data Quality Objectives Process*, QA/G-4. EPA 600/R-96/055, August 2000, Washington, D.C.

U.S. Environmental Protection Agency. 2001. *EPA Guidance for Quality Assurance Project Plans, QA/G*, EPA 240/B-01/003, March 2001, Washington, D.C.

U.S. Environmental Protection Agency. 2002. *EPA Requirements for Preparing Quality Assurance Project Plans*, QA/R-5*,* EPA 240/R-01/009, December 2002, Washington, D.C.

~~U.S. Environmental Protection Agency. 1997. *Compendium Method TO-14A: Determination of Volatile Organic Compounds (VOCs) In Ambient Air Using Specially Prepared Canisters With Subsequent Analysis By Gas Chromatography*, EPA 625/R-96/010b. Center for Environmental Research Information, Office of Research and Development, Cincinnati, OH, January 1997.~~

Washington Regulatory and Environmental Services, 2004. *Technical Evaluation Report for WIPP Room-Based VOC Monitoring*.

TABLES

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Table N-1
Target Analytes and Methods for ~~Confirmatory~~ Repository VOC (Station VOC-A and VOC-B) Monitoring and Disposal Room Monitoring ~~During the WIPP Disposal Phase~~

~~Target Analyte~~	~~Common Synonyms and Acronyms~~	~~Chemical~~	~~Molecular Weight (g/mol)~~	~~Boiling Point (/C)*~~
~~Carbon tetrachloride~~	~~Tetrachloromethane~~	~~CCl_4~~	~~153.8~~	~~77~~
~~Chlorobenzene~~	~~Monochlorobenzene, Benzene chloride~~	~~C_6H_5Cl~~	~~112.6~~	~~132~~
~~Chloroform~~	~~Trichloromethane~~	~~$CHCl_3$~~	~~119.4~~	~~61~~
~~1,1-Dichloroethylene~~	~~1,1-Dichloroethene, Vinylidene chloride, 1,1-DCE~~	~~$C_2H_2Cl_2$~~	~~96.95~~	~~31~~
~~1,2-Dichloroethane~~	~~1,2-DCA, DCA, Ethylene dichloride, EDC, sym-Dichloroethane~~	~~$C_2H_4Cl_2$~~	~~98.96~~	~~83~~
~~Methylene chloride~~	~~Dichloromethane~~	~~CH_2Cl_2~~	~~84.94~~	~~40~~
~~1,1,2,2-Tetrachloro-ethane~~	~~sym-Tetrachloroethane, Tetrachloroethane~~	~~$C_2H_2Cl_4$~~	~~167.9~~	~~147~~
~~Toluene~~	~~Methyl benzene~~	~~C_7H_8~~	~~92.13~~	~~111~~
~~1,1,1-Trichloroethane~~	~~1,1,1-TCA, TCA, Methyl chloroform~~	~~$C_2H_3Cl_3$~~	~~133.42~~	~~74~~

~~g/mol grams per mole~~
~~/C Degrees Celsius~~
~~* Handbook of Chemistry and Physics, 62nd Edition, CRC Press, 1982~~

Target Analyte	EPA Standard Analytical Method
Carbon tetrachloride	EPA TO-15[a] EPA SW-846[b] EPA SW-8260B[b]
Chlorobenzene	
Chloroform	
1,1-Dichloroethylene	
1,2-Dichloroethane	
Methylene chloride	
1,1,2,2 -Tetrachloroethane	
Toluene	
1,1,1- Trichloroethane	

[a] U.S. Environmental Protection Agency, 1999, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air- Second Edition, http://www.epa.gov/ttn/amtic/airtox.html
[b] U.S. Environmental Protection Agency, SW-846 Test Methods for Evaluation Solid Wastes, Chemical and Physical Methods, http://www.epa.gov/epaoswer/hazwaste/test/main.htm

Table N-2
~~Volatile Organic Compound Concentrations of Concern*~~

~~Compound~~	~~Molecular Weight (g/mol)~~	~~Drift E-300 Concentration~~	
		~~µg/m^3~~	~~ppbv~~
~~Carbon tetrachloride~~	~~153.8~~	~~1050~~	~~165~~
~~Chlorobenzene~~	~~112.6~~	~~1015~~	~~220~~
~~Chloroform~~	~~119.4~~	~~890~~	~~180~~
~~1,1-Dichloroethylene~~	~~96.95~~	~~410~~	~~100~~
~~1,2,-Dichloroethane~~	~~98.96~~	~~175~~	~~45~~
~~Methylene chloride~~	~~84.94~~	~~6700~~	~~1930~~
~~1,1,2,2-Tetrachloroethane~~	~~167.9~~	~~350~~	~~50~~
~~Toluene~~	~~92.13~~	~~715~~	~~190~~
~~1,1,1-Trichloroethane~~	~~133.42~~	~~3200~~	~~590~~

~~µg/m^3 micrograms per cubic meter~~
~~ppbv parts per billion by volume~~

~~* Calculated at 25 degrees Celsius and 760 millimeters of mercury.~~

~~Table N-3~~
~~Bromofluorobenzene Key Ions and Ion Abundance Criteria~~

~~Mass~~	~~Ion Abundance Criteria~~
~~50~~	~~8 to 40 percent of mass 95~~
~~75~~	~~30 to 66 percent of mass 95~~
~~95~~	~~Base Peak, 100 percent Relative Abundance~~
~~96~~	~~5 to 9 percent of mass 95~~
~~173~~	~~<2 percent of mass 174~~
~~174~~	~~50 to 120 percent of mass 95~~
~~175~~	~~4 to 9 percent of mass 174~~
~~176~~	~~93 to 101 percent of mass 174~~
~~177~~	~~5 to 9 percent of mass 176~~

~~Table N-4~~
Quality Assurance Objectives for Accuracy, Precision, Sensitivity, and Completeness

Compound	Accuracy (Percent Recovery)	Precision (RPD) Laboratory	Field	Required MRL (ppbv)	Completeness (Percent)
Carbon tetrachloride	60 to 140	25	35	2	90
Chlorobenzene	60 to 140	25	35	2	90
Chloroform	60 to 140	25	35	2	90
1,1-Dichloroethylene	60 to 140	25	35	5	90
1,2-Dichloroethane	60 to 140	25	35	2	90
Methylene chloride	60 to 140	25	35	5	90
1,1,2,2-Tetrachloroethane	60 to 140	25	35	2	90
Toluene	60 to 140	25	35	5	90
1,1,1-Trichloroethane	60 to 140	25	35	5	90

MRL method reporting limit
RPD relative percent difference

FIGURES

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Figure N-1
Panel Area Flow

Figure N-2
VOC Monitoring System Design

Figure N-3
~~Example Request for Analysis Form~~ Disposal Room VOC Monitoring

Figure N-4
~~Example of Chain of Custody Form~~ VOC Sample Head Arrangement

ATTACHMENT O

HAZARDOUS WASTE PERMIT APPLICATION PART A

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ATTACHMENT O

HAZARDOUS WASTE PERMIT APPLICATION PART A

TABLE OF CONTENTS

NOTE: The "Part A - Hazardous Waste Permit Application" is the document submitted by the Permittees. It refers to management, storage, and disposal of remote-handled (**RH**) transuranic waste. This Permit does not authorize these activities and they have been included only to indicate what the Permittees submitted to NMED. However, maps, facility drawings, and photographs in Appendices O2, O3, and O4 which depicted RH waste activities have been edited or removed.

NM4890139088

XII. 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, conveyance loading room, waste hoist 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 87.7 m^3, based on 40 standard waste boxes or seven-packs of drums on pallets and in the TRUDOCKs, one standard waste box of derived waste, seven RH canisters in the transfer cell, and five RH canisters in the hot cell. The second S01 HWMU is the parking area outside the WHB where the Contact Handled Package trailers and the road cask trailers will be parked awaiting waste handling operations. The capacity of this unit is 12 TRUPACT-IIs and three road casks or four rail casks with a combined volume of 47.1 m^3. The railroad side tracks are included in this area to accommodate rail shipments of RH TRU mixed waste. The HWMUs are shown in Appendix O3 as Figures O3-2, O3-3, and O3-4.

During the ten year period of the permit, up to ~~118,500~~ 131,250 m^3 of CH TRU mixed waste could be emplaced in Panels 1 to 7 and up to 3,250 m^3 of RH TRU mixed waste could be emplaced in Panels 3 to 7. Panels 8, 9 and 10 will be constructed under the initial term of this permit. These latter areas will not receive waste for disposal under this permit.

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 Inés R. Triay*
Title:	Acting Manager, Carlsbad Field Office
for:	U.S. Department of Energy
Date:	

Co-Operator Signature:	*Original signed by Richard D. Raaz*
Title:	General Manager
for:	Washington TRU Solutions LLC
Date:	2/3/05

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APPENDIX O1
OTHER ENVIRONMENTAL PERMITS

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ACTIVE ENVIRONMENTAL PERMITS AND APPROVALS FOR THE WASTE ISOLATION PILOT PLANT AS OF APRIL 1, 2003

	Granting Agency	Type of Permit	Permit Number	Granted/ Submitted	Expiration	Current Permit Status
1.	Department of the Interior, Bureau of Land Management	Right-of-Way for Water Pipeline	NM53809	08/17/83	In Perpetuity	Active
2.	Department of the Interior, Bureau of Land Management	Right-of-Way for the North Access Road	NM55676	08/24/83	None	Active
3.	Department of the Interior, Bureau of Land Management	Right-of-Way for Railroad	NM55699	09/27/83	None	Active
4.	Department of the Interior, Bureau of Land Management	Right-of-Way for Dosimetry and Aerosol Sampling Sites	NM63136	07/31/86	07/31/11	Active
5.	Department of the Interior, Bureau of Land Management	Right-of-Way for Seven Subsidence Monuments	NM65801	11/07/86	None	Active
6.	Department of the Interior, Bureau of Land Management	Right-of-Way for Aerosol Sampling Site	NM77921	08/18/89	08/18/19	Active
7.	Department of the Interior, Bureau of Land Management	Right-of-Way for 2 Survey Monuments	NM82245	12/13/89	12/13/19	Active
8.	Department of the Interior, Bureau of Land Management	Right-of-Way for telephone cable	NM46029	07/03/90	09/04/11	Active
9.	Department of the Interior, Bureau of Land Management	Right-of-Way for SPS Powerline	NM43203	02/20/96	10/19/11	Active
10.	Department of the Interior, Bureau of Land Management	Right-of-Way for South Access Road	NM46130	09/26/94	08/17/31	Active
11.	Department of the Interior, Bureau of Land Management	Right-of-Way for Duval telephone line	NM60174	11/06/96	03/08/15	Active
12.	Department of the Interior, Bureau of Land Management	Right-of-Way for Wells AEC-7 & AEC-8	NM108365	8/30/02	08/30/32	Active
13.	Department of the Interior, Bureau of Land Management	Right-of-Way for ERDA-6	NM108365	8/30/02	08/30/32	Active
14.	Department of the Interior, Bureau of Land Management	Right-of-Way for Well C-2756 (P-18)	NM108365	8/30/02	08/30/32	Active
15.	Department of the Interior, Bureau of Land Management	Right-of-Way for Monitoring Well C-2664 (Cabin Baby)	NM107944	04/23/02	04/23/32	Active
16.	Department of the Interior, Bureau of Land Management	Right-of-Way for Seismic Monitoring Station	NM85426	09/23/91	None	Active

	Granting Agency	Type of Permit	Permit Number	Granted/ Submitted	Expiration	Current Permit Status
17.	Department of the Interior, Bureau of Land Management	Right-of-Way for Wells C-2725 (H-4A), C-2775 (H-4B), & C-2776 (H-4C)	NM-6-5 Cooperative Agreement	04/27/78	None	Active
18.	Department of the Interior, Bureau of Land Management	Right-of-Way for Monitoring Wells C-2723 (WIPP-25), C-2724 (WIPP-26), C-2722 (WIPP-27), C-2636 (WIPP-28), C-2743 (WIPP-29), & C-2727 (WIPP-30)	NM-6-5 Cooperative Agreement	06/14/78	None	Active
19.	Department of the Interior, Bureau of Land Management	Right-of-Way for Aerosol Sampling Sites	NM77921	10/03/89	08/18/19	Active
20.	Department of the Interior, Bureau of Land Management	Right-of-Way easement for accessing state trust lands in Eddy & Lea Counties	NM25430	02/29/00	09/28/04	Active
21.	U.S. Department of the Interior, Fish and Wildlife Service	Concurrence that WIPP construction activities will have no significant impact on federally-listed threatened or endangered species	None	05/29/80	None	Active
22.	U.S. Department of the Interior, Fish and Wildlife Service	Master Personal Banding	#22478	05/19/93	Auto. Renewed every 3 years	Active
23.	New Mexico Commissioner of Public Lands	Right-of-Way for High Volume Air Sampler	RW-22789	10/03/85	10/03/20	Active
24.	New Mexico Environment Department Groundwater Bureau	Discharge Permit	DP-831	07/03/97	07/03/02 (Comments on Draft Renewal submitted April 10, 2003)	Active
25.	New Mexico Environment Department Air Quality Bureau	Operating Permit for two backup diesel generators	310-M-2	12/07/93	None	Active
26.	New Mexico Department of Game and Fish	Concurrence that WIPP construction activities will have no significant impact on state-listed threatened or endangered species	None 07/25/83	05/26/89	None	Active
27.	New Mexico Environment Department-UST Bureau	Underground Storage Tanks	NMED11811 (Number changes annually)	07/01/02	06/30/03 (2003 registration submitted 6/18/02)	Active

	Granting Agency	Type of Permit	Permit Number	Granted/ Submitted	Expiration	Current Permit Status
28.	New Mexico State Engineer Office	Monitoring Well Exhaust Shaft Exploratory Borehole	C-2801	02/23/01	None	Active
29.	New Mexico State Engineer Office	Monitoring Well Exhaust Shaft Exploratory Borehole	C-2802	02/23/01	None	Active
30.	New Mexico State Engineer Office	Monitoring Well Exhaust Shaft Exploratory Borehole	C-2803	02/23/01	None	Active
31.	New Mexico State Engineer Office	Monitoring Well	C-2811	03/02/02	None	Active
32.	New Mexico State Engineer Office	Appropriation: WQSP-1 Well	C-2413	10/21/96	None	Active
33.	New Mexico State Engineer Office	Appropriation: WQSP-2 Well	C-2414	10/21/96	None	Active
34.	New Mexico State Engineer Office	Appropriation: WQSP-3 Well	C-2415	10/21/96	None	Active
35.	New Mexico State Engineer Office	Appropriation: WQSP-4 Well	C-2416	10/21/96	None	Active
36.	New Mexico State Engineer Office	Appropriation: WQSP-5 Well	C-2417	10/21/96	None	Active
37.	New Mexico State Engineer Office	Appropriation: WQSP-6 Well	C-2418	10/21/96	None	Active
38.	New Mexico State Engineer Office	Appropriation: WQSP-6a Well	C-2419	10/21/96	None	Active
39.	New Mexico State Engineer Office	Monitoring Well AEC-7	C-2742	11/06/00	None	Active
40.	New Mexico State Engineer Office	Monitoring Well AEC-8	C-2744	11/06/00	None	Active
41.	New Mexico State Engineer Office	Monitoring Well Cabin Baby	C-2664	07/30/99	None	Active
42.	New Mexico State Engineer Office	Monitoring Well D-268 Plugged to 220'. Livestock watering	C-2638	01/12/99	None	Active
43.	New Mexico State Engineer Office	Monitoring Well DOE-1	C-2757	11/06/00	None	Active
44.	New Mexico State Engineer Office	Monitoring Well DOE-2	C-2682	04/17/00	None	Active
45.	New Mexico State Engineer Office	Monitoring Well ERDA-9	C-2752	11/06/00	None	Active
46.	New Mexico State Engineer Office	Monitoring Well H-1	C-2765	11/06/00	None	Active

	Granting Agency	Type of Permit	Permit Number	Granted/ Submitted	Expiration	Current Permit Status
47.	New Mexico State Engineer Office	Monitoring Well H-2A	C-2762	11/06/00	None	Active
48.	New Mexico State Engineer Office	Monitoring Well H-2B1	C-2758	11/06/00	None	Active
49.	New Mexico State Engineer Office	Monitoring Well H-2B2	C-2763	11/06/00	None	Active
50.	New Mexico State Engineer Office	Monitoring Well H-2C	C-2759	11/06/00	None	Active
51.	New Mexico State Engineer Office	Monitoring Well H-3B1	C-2764	11/06/00	None	Active
52.	New Mexico State Engineer Office	Monitoring Well H-3B2	C-2760	11/06/00	None	Active
53.	New Mexico State Engineer Office	Monitoring Well H-3B3	C-2761	11/06/00	None	Active
54.	New Mexico State Engineer Office	Monitoring Well H-3D	pending	11/06/00	None	Active
55.	New Mexico State Engineer Office	Monitoring Well H-4A	C-2725	11/06/00	None	Active
56.	New Mexico State Engineer Office	Monitoring Well H-4B	C-2775	11/06/00	None	Active
57.	New Mexico State Engineer Office	Monitoring Well H-4C	C-2776	11/06/00	None	Active
58.	New Mexico State Engineer Office	Monitoring Well H-5A	C-2746	11/06/00	None	Active
59.	New Mexico State Engineer Office	Monitoring Well H-5B	C-2745	11/06/00	None	Active
60.	New Mexico State Engineer Office	Monitoring Well H-5C	C-2747	11/06/00	None	Active
61.	New Mexico State Engineer Office	Monitoring Well H-6A	C-2751	11/06/00	None	Active
62.	New Mexico State Engineer Office	Monitoring Well H-6B	C-2749	11/06/00	None	Active
63.	New Mexico State Engineer Office	Monitoring Well H-6C	C-2750	11/06/00	None	Active
64.	New Mexico State Engineer Office	Monitoring Well H-7A	C-2694	04/17/00	None	Active
65.	New Mexico State Engineer Office	Monitoring Well H-7B1	C-2770	11/06/00	None	Active

	Granting Agency	Type of Permit	Permit Number	Granted/ Submitted	Expiration	Current Permit Status
66.	New Mexico State Engineer Office	Monitoring Well H-7B2	C-2771	11/06/00	None	Active
67.	New Mexico State Engineer Office	Monitoring Well H-7C	C-2772	11/06/00	None	Active
68.	New Mexico State Engineer Office	Monitoring Well H-8A	C-2780	11/06/00	None	Active
69.	New Mexico State Engineer Office	Monitoring Well H-8B	C-2781	11/06/00	None	Active
70.	New Mexico State Engineer Office	Monitoring Well H-8C	C-2782	11/06/00	None	Active
71.	New Mexico State Engineer Office	Monitoring Well H-9A	C-2785	11/06/00	None	Active
72.	New Mexico State Engineer Office	Monitoring Well H-9B	C-2783	11/06/00	None	Active
73.	New Mexico State Engineer Office	Monitoring Well H-9C	C-2784	11/06/00	None	Active
74.	New Mexico State Engineer Office	Monitoring Well H-10A	C-2779	11/06/00	None	Active
75.	New Mexico State Engineer Office	Monitoring Well H-10B	C-2778	11/06/00	None	Active
76.	New Mexico State Engineer Office	Monitoring Well H-10C	C-2695	04/17/00	None	Active
77.	New Mexico State Engineer Office	Monitoring Well H-11B1	C-2767	11/06/00	None	Active
78.	New Mexico State Engineer Office	Monitoring Well H-11B2	C-2687	04/17/00	None	Active
79.	New Mexico State Engineer Office	Monitoring Well H-11B3	C-2768	11/06/00	None	Active
80.	New Mexico State Engineer Office	Monitoring Well H-11B4	C-2769	11/06/00	None	Active
81.	New Mexico State Engineer Office	Monitoring Well H-12	C-2777	11/06/00	None	Active
82.	New Mexico State Engineer Office	Monitoring Well H-14	C-2766	11/06/00	None	Active
83.	New Mexico State Engineer Office	Monitoring Well H-15	C-2685	04/17/00	None	Active
84.	New Mexico State Engineer Office	Monitoring Well H-16	C-2753	11/06/00	None	Active

	Granting Agency	Type of Permit	Permit Number	Granted/ Submitted	Expiration	Current Permit Status
85.	New Mexico State Engineer Office	Monitoring Well H-17	C-2773	11/06/00	None	Active
86.	New Mexico State Engineer Office	Monitoring Well H-18	C-2683	04/17/00	None	Active
87.	New Mexico State Engineer Office	Monitoring Well H-19B0	C-2420	01/25/95	01/31/98	Inactive Renew when necessary
88.	New Mexico State Engineer Office	Monitoring Well H-19B1	C-2420	01/25/95	01/31/98	Inactive Renew when necessary
89.	New Mexico State Engineer Office	Monitoring Well H-19B2	C-2421	01/25/95	01/31/98	Inactive Renew when necessary
90.	New Mexico State Engineer Office	Monitoring Well H-19B3	C-2422	01/25/95	01/31/98	Inactive Renew when necessary
91.	New Mexico State Engineer Office	Monitoring Well H-19B4	C-2423	01/25/95	01/31/98	Inactive Renew when necessary
92.	New Mexico State Engineer Office	Monitoring Well H-19B5	C-2424	01/25/95	01/31/98	Inactive Renew when necessary
93.	New Mexico State Engineer Office	Monitoring Well H-19B6	C-2425	01/25/95	01/31/98	Inactive Renew when necessary
94.	New Mexico State Engineer Office	Monitoring Well H-19B7	C-2426	01/25/95	01/31/98	Inactive Renew when necessary
95.	New Mexico State Engineer Office	Monitoring Well P-14	C-2637	01/02/99	None	P&A
96.	New Mexico State Engineer Office	Monitoring Well P-15	C-2686	04/17/00	None	P&A
97.	New Mexico State Engineer Office	Monitoring Well P-17	C-2774	11/06/00	None	Active
98.	New Mexico State Engineer Office	Monitoring Well P-18	C-2756	11/06/00	None	P&A
99.	New Mexico State Engineer Office	Monitoring Well WIPP-12	C-2639	01/12/99	None	Active
100.	New Mexico State Engineer Office	Monitoring Well WIPP-13	C-2748	11/06/00	None	Active

	Granting Agency	Type of Permit	Permit Number	Granted/ Submitted	Expiration	Current Permit Status
101.	New Mexico State Engineer Office	Monitoring Well WIPP-18	C-2684	04/17/00	None	Active
102.	New Mexico State Engineer Office	Monitoring Well WIPP-19	C-2755	11/06/00	None	Active
103.	New Mexico State Engineer Office	Monitoring Well WIPP-21	C-2754	11/06/00	None	Active
104.	New Mexico State Engineer Office	Monitoring Well WIPP-25	C-2723	07/26/00	None	Active
105.	New Mexico State Engineer Office	Monitoring Well WIPP-26	C-2724	11/06/00	None	Active
106.	New Mexico State Engineer Office	Monitoring Well WIPP-27	C-2722	11/06/00	None	Active
107.	New Mexico State Engineer Office	Monitoring Well WIPP28	C-2636	01/12/99	None	P&A
108.	New Mexico State Engineer Office	Monitoring Well WIPP-29	C-2743	11/06/00	None	Active
109.	New Mexico State Engineer Office	Monitoring Well WIPP-30	C-2727	08/04/00	None	Active

P&A - Plugged and Abandoned

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APPENDIX O2
MAPS

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Figure O2-1
General Location of the WIPP Facility

Figure O2-2
Planimetric Map-WIPP Facility Boundaries

Figure O2-2a
Legend to Figure O2-2

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APPENDIX O3
FACILITIES

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Figure O3-1
Spatial View of the WIPP Facility

Figure O3-2
Repository Horizon

Figure O3-3
Waste Handling Building-Container Storage Unit

Figure O3-4
Parking Area-Container Storage Unit

APPENDIX O4
PHOTOGRAPHS

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Figure O4-1
Aerial Photograph of the Waste Isolation Pilot Plant

Figure O4-2
Underground - Panel One - Waste ~~Storage~~ Disposal Room

Figure O4-3
Aerial Photograph of the Waste Handling Building

Figure O4-4
TRUDOCKs in CH Bay of the Waste Handling Building

Figure O4-5
NE Corner of CH Bay of the Waste Handling Building

Figure O4-6
Westward View of CH Bay of the Waste Handling Building

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

Figure O4-8
RH Bay (Photo Taken July 2000)

Figure O4-9
Cask Unloading Room and Bridge Crane

Figure O4-10
Hot Cell

Figure O4-11
Transfer Cell

Figure O4-12
Facility Cask Loading Room and Facility Cask Rotating Device

Replace this page with the Topographic Map from the earlier version of the draft Permit