

**ATTACHMENT C**  
**WASTE ANALYSIS PLAN**

Waste Isolation Pilot Plant  
Hazardous Waste Permit  
November 30, 2010

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**ATTACHMENT C**  
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1 **ATTACHMENT C**

2 **WASTE ANALYSIS PLAN**

3 C-0 Introduction and Attachment Highlights

4 This waste analysis plan (**WAP**) has been prepared for management, storage, or disposal  
5 activities to be conducted at the Waste Isolation Pilot Plant (**WIPP**) facility to meet requirements  
6 set forth in 20.4.1.500 NMAC (incorporating 40 CFR §264.13). Guidance in the most recent U.S.  
7 Environmental Protection Agency (**EPA**) manual on waste analysis has been incorporated into  
8 the preparation of this WAP (EPA, 1994). This WAP includes test methods, details of planned  
9 waste sampling and analysis for complying with the general waste analysis requirements of  
10 20.4.1.500 NMAC (incorporating 40 CFR §264.13), a description of the waste shipment  
11 screening and verification process, and a description of the quality assurance (**QA**)/quality  
12 control (**QC**) program. Before the Permittees manage, store, or dispose transuranic (**TRU**)  
13 mixed waste from a generator/storage site (**site**), the Permittees shall require that site to  
14 implement the applicable requirements of this WAP.

15 TRU mixed waste that may be stored or disposed at WIPP are or were generated at U.S.  
16 Department of Energy (**DOE**) generator/storage sites by various specific processes and  
17 activities. Examples of the major types of operations that generate this waste include:

- 18 • Production of Nuclear Products—Production of nuclear products includes reactor  
19 operation, radionuclide separation/finishing, and weapons fabrication and  
20 manufacturing. The majority of the TRU mixed waste was generated by weapons  
21 fabrication and radionuclide separation/finishing processes. More specifically, wastes  
22 consist of residues from chemical processes, air and liquid filtration, casting,  
23 machining, cleaning, product quality sampling, analytical activities, and maintenance  
24 and refurbishment of equipment and facilities.
- 25 • Plutonium Recovery—Plutonium recovery wastes are residues from the recovery of  
26 plutonium-contaminated molds, metals, glass, plastics, rags, salts used in  
27 electrorefining, precipitates, firebrick, soot, and filters.
- 28 • Research and Development (**R&D**)—R&D projects include a variety of hot cell or  
29 glovebox activities that often simulate full-scale operations described above, producing  
30 similar TRU mixed wastes. Other types of R&D projects include metallurgical research,  
31 actinide separations, process demonstrations, and chemical and physical properties  
32 determinations.
- 33 • Decontamination and Decommissioning—Facilities and equipment that are no longer  
34 needed or usable are decontaminated and decommissioned, resulting in TRU mixed  
35 wastes consisting of scrap materials, cleaning agents, tools, piping, filters, Plexiglas™,  
36 gloveboxes, concrete rubble, asphalt, cinder blocks, and other building materials.  
37 These materials are expected to be the largest category by volume of TRU mixed  
38 waste to be generated in the future.

39 TRU mixed waste contains both TRU radioactive and hazardous components, as defined in  
40 20.4.1.800 NMAC (incorporating 40 CFR, §268.35(d)), and in the Federal Facility Compliance

1 Act, Public Law 102- 386, Title 1, §3021(d). It is designated and separately packaged as either  
2 contact-handled (**CH**) or remote-handled (**RH**), based on the radiological dose rate at the  
3 surface of the waste container.

4 The hazardous components of the TRU mixed waste to be managed at the WIPP facility are  
5 designated in Table C-9. Some of the waste may also be identified by unique state hazardous  
6 waste codes or numbers. These wastes are acceptable at WIPP as long as the Treatment,  
7 Storage, and Disposal Facility Waste Acceptance Criteria (**TSDF-WAC**) in Module II are met.  
8 This WAP describes the measures that will be taken to ensure that the TRU mixed wastes  
9 received at the WIPP facility are within the scope of Table C-9 as established by 20.4.1.500  
10 NMAC (incorporating 40 CFR §264), and that they comply with unit-specific requirements of  
11 20.4.1.500 NMAC (incorporating 40 CFR §264.600), Miscellaneous Units.

12 Some TRU mixed waste is retrievably stored at the DOE generator/storage sites. Additional  
13 TRU mixed waste will be generated and packaged into containers at these generator/storage  
14 sites in the future. TRU mixed waste will be retrieved from storage areas at a DOE  
15 generator/storage site. Retrievably stored waste is defined as TRU mixed waste generated after  
16 1970 and before the New Mexico Environment Department (**NMED**) notifies the Permittees, by  
17 approval of the final audit report, that the characterization requirements of the WAP at a  
18 generator/storage site have been implemented. Newly generated waste is defined as TRU  
19 mixed waste generated after NMED approves the final audit report for a generator/storage site.  
20 Acceptable knowledge (**AK**) information is assembled for both retrievably stored and newly  
21 generated waste. Waste characterization of retrievably stored TRU mixed waste will be  
22 performed on an ongoing basis, as the waste is retrieved. Waste characterization of newly  
23 generated TRU mixed waste is typically performed as it is generated, although some  
24 characterization occurs post-generation. Waste characterization requirements for newly  
25 generated and retrievably stored TRU mixed wastes differ, as discussed in Sections C-3d(1)  
26 and C-3d(2).

27 Waste characterization is defined in Module I as the activities performed by the waste generator  
28 to satisfy the general waste analysis requirements of 20.4.1.500 NMAC (incorporating 40 CFR  
29 §264.13(a)) before waste containers have been certified for disposal at WIPP. The  
30 characterization process for WIPP waste is presented in Figure C-2. Generator site waste  
31 characterization programs are first audited by DOE, with NMED approving the final audit report.  
32 After this, generator sites determine whether AK alone is sufficient for characterization, or  
33 whether a sampling and analysis program in conjunction with AK is necessary to adequately  
34 characterize wastes. If an AK Sufficiency Determination is sought, information is provided to the  
35 Permittees for their review and DOE's provisional approval; NMED determination of adequacy  
36 of the AK information is required before final approval by DOE. If the sampling and analysis  
37 route is chosen, sites proceed to sample and analyze waste in conjunction with AK and in  
38 accordance with this WAP. Once an AK Sufficiency Determination is obtained, or when required  
39 sampling and analysis data are obtained, sites would then prepare and submit the Waste  
40 Stream Profile Form for DOE's approval. Once the WSPF is approved, a site may ship waste to  
41 WIPP. The Permittees will perform waste confirmation prior to shipment of the waste from the  
42 generator/storage site to WIPP pursuant to Permit Attachment C7, by performing radiography or  
43 visual examination of a representative subpopulation of certified waste containers, to ensure  
44 that the wastes meet the applicable requirements of the TSDF-WAC.

1 C-0a Waste Characterization

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

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

18 S3000 - Homogeneous Solids

19 Homogeneous solids are defined as solid materials, excluding soil, that do not meet the  
20 NMED criteria for classification as debris (20.4.1.800 NMAC (incorporating 40 CFR  
21 §268.2[g] and [h])). Included in the series of homogeneous solids are inorganic process  
22 residues, inorganic sludges, salt waste, and pyrochemical salt waste. Other waste streams  
23 are included in this Summary Category Group based on the specific waste stream types  
24 and final waste form. This Summary Category Group is expected to contain toxic metals  
25 and spent solvents. This category includes wastes that are at least 50 percent by volume  
26 homogeneous solids.

27 S4000 - Soils/Gravel

28 This Summary Category Group includes S4000 waste streams that are at least 50 percent  
29 by volume soil/gravel. This Summary Category Group is expected to contain toxic metals.

30 S5000 - Debris Wastes

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

- 35 1. a manufactured object, or  
36 2. plant or animal matter, or  
37 3. natural geologic material.

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

40 If a waste does not include at least 50 percent of any given Summary Category Group by  
41 volume, characterization shall be performed using the waste characterization process required

1 for the category constituting the greatest volume of waste for that waste stream (see Section C-  
2 3d).

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

5 Metals

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

15 Halogenated Volatile Organic Compounds

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

28 Nonhalogenated Volatile Organic Compounds

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

35 The generator/storage sites shall characterize their waste in accordance with this WAP and  
36 associated Permit Attachments, and ensure that waste proposed for storage and disposal at  
37 WIPP meets the applicable requirements of the TSDf-WAC in Module II. The generator/storage  
38 site shall assemble the Acceptable Knowledge (AK) information into an auditable record<sup>1</sup> for the

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<sup>1</sup> "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.

1 waste stream as described in Permit Attachment C4. For those waste streams with an approved  
2 AK Sufficiency Determination (see below), sampling and analysis per the methods described in  
3 Permit Attachments C1 and C2 are not required.

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

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

19 C-0b AK Sufficiency Determination

20 Generator/storage sites may submit a request to the Permittees for an AK Sufficiency  
21 Determination (**Determination Request**) to meet all or part of the waste characterization  
22 requirements. The contents of the Determination Request are specified in Permit Attachment  
23 C4, Section C4-3d. The Determination Request may take one of the following forms:

- 24 Scenario 1 Radiography or visual examination (**VE**) of the waste stream is not required,  
25 and chemical sampling and analysis is not required;
- 26 Scenario 2 Radiography or VE of the waste stream is not required, but chemical  
27 sampling and analysis of a representative sample of the waste stream is  
28 required; or
- 29 Scenario 3 Chemical sampling and analysis is not required, but radiography or VE of  
30 100% of the containers in the waste stream is required.

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

- 34 • The Determination Request must include all information specified in Permit Attachment  
35 C4, Section C4-3d

- 1       • The AK Summary must identify relevant hazardous constituents, and must correctly  
2       identify all toxicity characteristic and listed hazardous waste numbers.
  
- 3       • All hazardous waste number assignments must be substantiated by supporting data  
4       and, if not, whether this lack of substantiation compromises the interpretation.
  
- 5       • Resolution of data discrepancies between different AK sources must be technically  
6       correct and documented.
  
- 7       • The AK Summary must include all the identification of waste material parameter  
8       weights by percentage of the material in the waste stream, and determinations must  
9       be technically correct.
  
- 10      • All prohibited items specified in the TSDF-WAC should be addressed, and conclusions  
11      drawn must be technically adequate and substantiated by supporting information.
  
- 12      • If the AK record includes process control information specified in Permit Attachment  
13      C4, Section C4-3b, the information should include procedures, waste manifests, or  
14      other documentation demonstrating that the controls were adequate and sufficient.
  
- 15      • The site must provide the supporting information necessary to substantiate technical  
16      conclusions within the Determination Request, and this information must be correctly  
17      interpreted.

18      The Permittees will review the Determination Request for technical adequacy and compliance  
19      with the requirements of the Permit, using trained and qualified individuals in accordance with  
20      standard operating procedures that shall, at a minimum, address all of the technical and  
21      procedural requirements listed above. The Permittees shall resolve comments with the  
22      generator/storage site, and the Permittees may change the scope of the Determination Request  
23      to one of the three scenarios.

24      If DOE determines that the AK is sufficient, it shall inform the public of the Determination  
25      Request, the Permittees' evaluation of it, and the date and time of a public meeting to provide  
26      information to and solicit comments from interested members of the public regarding the  
27      Determination Request. Notice of the meeting and comment period shall be provided by the  
28      following methods:

- 29           1.      Written notice to all individuals on the facility mailing list;
  
- 30           2.      Public notice in area newspapers, including the Carlsbad Current-Argus,  
31                    Albuquerque Journal, and Santa Fe New Mexican
  
- 32           3.      Notice on the WIPP Home Page;
  
- 33           4.      E-mail notification as specified in Permit Section 1.11.

34      DOE shall take written comment on the Determination Request for at least 30 days following the  
35      public meeting. DOE shall compile all such comments, including any disagreement between the  
36      DOE and commenters.

1 If DOE provisionally approves the Determination Request, it may forward it along with all  
2 relevant information submitted with the Determination Request to NMED for an evaluation that  
3 the provisional approval made by DOE is adequate. DOE shall also provide to NMED, as a  
4 separate appendix to the Determination Request, the compilation of all comments and DOE's  
5 response to each comment. After submitting a Determination Request to NMED, the Permittees  
6 will post a link to the transmittal letter to NMED on the WIPP Home Page and inform those on  
7 the e-mail notification list as specified in Permit Section 1.11. Based on the results of NMED's  
8 evaluation, the Permittees will notify the generator/storage sites whether the AK information is  
9 sufficient and the Determination Request is approved. DOE will not approve a Determination  
10 Request that NMED has determined to be inadequate unless the generator/storage site  
11 resolves the inadequacies and provides the resolution to NMED for evaluation of adequacy.  
12 Should the inadequacies not be resolved to NMED's satisfaction, DOE shall not submit a  
13 Determination Request for the same waste stream at a later date. DOE shall not submit a  
14 Determination Request if a previous Determination Request is pending evaluation by NMED.

15 In the event DOE disagrees, in whole or in part, with an evaluation performed by NMED  
16 resulting in a determination by NMED that DOE's provisional approval for a particular waste  
17 stream is inadequate, DOE may seek dispute resolution. The dispute resolution process is  
18 specified in Part 1. The Secretary's final decision under Permit Section 1.16.4 shall constitute a  
19 final agency action.

20 By July 1 of each year, the Permittees shall submit to NMED a list of waste streams the  
21 Permittees may submit for an AK Sufficiency Determination during the upcoming federal fiscal  
22 year. The Permittees will post a link to the transmittal letter to NMED and announce a public  
23 meeting to discuss the list with interested members of the public on the WIPP Home Page and  
24 inform those on the e-mail notification list as specified in Permit Section 1.11.

25 If a generator/storage site does not submit a Determination Request, or if DOE does not  
26 approve a Determination Request, or if NMED finds that DOE's provisional approval of a  
27 Determination Request is inadequate, the generator/storage site shall perform radiography or  
28 VE on 100% of the containers in a waste stream and chemical sampling and analysis on a  
29 representative sample of the waste stream using headspace gas sampling and analysis (for  
30 debris waste) or solids sampling and analysis (for homogeneous solid or soil/gravel waste) as  
31 specified in Permit Attachments C1 and C2.

32 If a generator/storage site submits a Determination Request, DOE provisionally approves the  
33 Determination Request as Scenario 1, and NMED finds that DOE's provisional approval is  
34 adequate, neither radiography or VE nor chemical sampling and analysis of the waste stream is  
35 required.

36 If a generator/storage site submits a Determination Request, DOE provisionally approves the  
37 Determination Request as Scenario 2, and NMED finds that DOE's provisional approval is  
38 adequate, chemical sampling and analysis of a representative sample of the waste stream is  
39 required, but radiography or VE is not required.

40 If a generator/storage site submits a Determination Request, DOE provisionally approves the  
41 Determination Request as Scenario 3, and NMED finds that DOE's provisional approval is  
42 adequate, radiography or VE of 100% of the containers in the waste stream is required, but  
43 chemical sampling and analysis is not required.

1 C-0c Waste Stream Profile Form Completion

2 After a complete AK record has been compiled and either a Determination Request has been  
3 approved by DOE or the generator/storage site has completed the applicable representative  
4 sampling and analysis requirements specified in Permit Attachments C1 and C2, the  
5 generator/storage site will complete a Waste Stream Profile Form (**WSPF**) and Characterization  
6 Information Summary (**CIS**). The requirements for the completion of a WSPF and a CIS are  
7 specified in Permit Attachment C3, Sections C3-12b(1) and C3-12b(2) respectively.

8 The WSPF and the CIS for the waste stream resulting from waste characterization activities  
9 shall be transmitted to the Permittees, who shall review them for completeness, and screen  
10 them for acceptance prior to loading any TRU mixed waste into the Contact-Handled or  
11 Remote-Handled Packaging at the generator facility, as described in Section C-4. The review  
12 and approval process will ensure that the submitted waste analysis information is sufficient to  
13 meet the Data Quality Objectives (**DQOs**) for AK in Section C-4a(1) and allow the Permittees to  
14 demonstrate compliance with the requirements of this WAP. Only TRU mixed waste and TRU  
15 waste that has been characterized in accordance with this WAP and that meets the **TSDf-WAC**  
16 specified in this Permit will be accepted at the WIPP facility for disposal in a permitted  
17 Underground Hazardous Waste Disposal Unit (**HWDU**). DOE will approve and provide NMED  
18 with copies of the approved WSPF and accompanying CIS prior to waste stream shipment.  
19 Upon notification of DOE's approval of the WSPF by, the generator/storage site may be  
20 authorized to ship waste to WIPP.

21 In the event the Permittees request detailed information on a waste stream, the site will provide  
22 a Waste Stream Characterization Package (Section C3-12b(2)). For each waste stream, this  
23 package will include the WSPF, the CIS, and the complete AK summary. The Waste Stream  
24 Characterization Package will also include specific Batch Data Reports (**BDRs**) and raw  
25 analytical data associated with waste container characterization as requested by the Permittees.

26 C-0d Waste Confirmation

27 The Permittees will perform waste confirmation on a representative subpopulation of each  
28 waste stream shipment after certification and prior to shipment pursuant to Permit Attachment  
29 C7. The Permittees will use radiography, review of radiography audio/video recordings, **VE**, or  
30 review of VE records (e.g., VE data sheets or packaging logs) to examine at least 7 percent of  
31 each waste stream shipment to confirm that the waste does not contain ignitable, corrosive, or  
32 reactive waste. Waste confirmation will be performed by the Permittees prior to shipment of the  
33 waste from the generator/storage site to WIPP.

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

35 C-1a Waste Stream Identification

36 TRU mixed waste destined for disposal at WIPP will be characterized on a waste stream basis.  
37 Generator/storage sites will delineate waste streams using acceptable knowledge. Required  
38 acceptable knowledge is specified in Section C-3b and Permit Attachment C4.

39 All of the waste within a waste stream may not be accessible for sampling and analysis at one  
40 time. Permit Attachment C2 addresses the requirements for selecting waste containers used for  
41 characterization of waste streams as they are generated or retrieved.

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

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

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

20 C-1c Waste Prohibited at the WIPP Facility

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

- 22 • liquid waste is not acceptable at WIPP. Liquid in the quantities delineated below is  
23 acceptable:
  - 24 – Observable liquid shall be no more than 1 percent by volume of the outermost  
25 container at the time of radiography or visual examination
  - 26 – Internal containers with more than 60 milliliters or 3 percent by volume observable  
27 liquid, whichever is greater, are prohibited
  - 28 – Containers with Hazardous Waste Number U134 assigned shall have no  
29 observable liquid
  - 30 – Overpacking the outermost container that was examined during radiography or  
31 visual examination or redistributing untreated liquid within the container shall not be  
32 used to meet the liquid volume limits
- 33 • non-radionuclide pyrophoric materials, such as elemental potassium
- 34 • hazardous wastes not occurring as co-contaminants with TRU mixed wastes (non-  
35 mixed hazardous wastes)
- 36 • wastes incompatible with backfill, seal and panel closures materials, container and  
37 packaging materials, shipping container materials, or other wastes

- 1       • wastes containing explosives or compressed gases
- 2       • wastes with polychlorinated biphenyls (**PCBs**) not authorized under an EPA PCB
- 3       waste disposal authorization
- 4       • wastes exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA
- 5       Hazardous Waste Numbers of D001, D002, or D003)
- 6       • waste that has ever been managed as high-level waste and waste from tanks specified
- 7       in Table C-8, unless specifically approved through a Class 3 permit modification
- 8       • any waste container from a waste stream (or waste stream lot) which has not
- 9       undergone either radiographic or visual examination of a statistically representative
- 10       subpopulation of the waste stream in each shipment, pursuant to Permit Attachment
- 11       C7
- 12       • any waste container from a waste stream which has not been preceded by an
- 13       appropriate, certified WSPF (see Section C-1d)

14 Before accepting a container holding TRU mixed waste, the Permittees will perform waste  
15 confirmation activities pursuant to Permit Attachment C7 on each waste stream shipment to  
16 confirm that the waste does not contain ignitable, corrosive, or reactive waste and the assigned  
17 EPA hazardous waste numbers are allowed for storage and disposal by this Permit. Waste  
18 confirmation activities will be performed on at least 7 percent of each waste stream shipped,  
19 equating to examination of at least one of fourteen containers in each waste stream shipment. If  
20 a waste stream shipment contains fewer than fourteen containers, one container will be  
21 examined to satisfy waste confirmation requirements. Section C-4 and Permit Attachment C7  
22 include descriptions of the waste confirmation processes that the Permittees will conduct prior to  
23 receiving a shipment at the WIPP facility.

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

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

#### 32 C-1d Control of Waste Acceptance

33 Every waste stream shipped to WIPP shall be preceded by a WSPF (Figure C-1) and a CIS.  
34 The required WSPF information and the CIS elements are found in Section C3-12b(1) and  
35 Section C3-12b(2).

36 Generator/storage sites will provide the WSPF to the Permittees for each waste stream prior to  
37 its acceptance for disposal at WIPP. The WSPF and the CIS will be transmitted to the  
38 Permittees for each waste stream from a generator/storage site. If continued waste  
39 characterization reveals discrepancies that identify different hazardous waste numbers or

1 indicates that the waste belongs to a different waste stream, the waste will be redefined to a  
2 separate waste stream and a new WSPF submitted. Generator/storage sites will develop criteria  
3 to determine the specific circumstances under which a WSPF is revised versus when a new  
4 WSPF is required. These criteria will be evaluated by DOE during site audits (Attachment C6).

5 The Permittees are responsible for the review of WSPFs and CISs to verify compliance with the  
6 restrictions on TRU mixed wastes for WIPP disposal. DOE will approve and submit completed  
7 WSPFs to NMED prior to waste stream shipment. The Permittees will be responsible for the  
8 review of shipping records (Section C-5) to ensure that each waste container has been  
9 prepared and characterized in accordance with applicable provisions of this WAP. Waste  
10 characterization data shall ensure the absence of prohibited items specified in Section C-1c.

11 Any time the Permittees request additional information concerning a waste stream, the  
12 generator/storage site will provide a Waste Stream Characterization Package (Section C3-  
13 12b(2)). The option for the Permittees to request additional information ensures that the waste  
14 being offered for disposal is adequately characterized and accurately described on the WSPF.

#### 15 C-1e Waste Generating Processes at the WIPP Facility

16 Waste generated as a result of the waste containers handling and processing activities at the  
17 WIPP facility is termed "derived" waste. Because derived wastes can contain only those RCRA-  
18 regulated materials present in the waste from which they were derived, no additional  
19 characterization of the derived waste is required for disposal purposes. In other words, the  
20 generator/storage site's characterization data and knowledge of the processes at the WIPP  
21 facility will be used to identify and characterize hazardous waste and hazardous constituents in  
22 derived waste. The management of derived waste is addressed in Permit Attachment A1.

#### 23 C-2 Waste Characterization Program Requirements and Waste Characterization Parameters

24 The Permittees shall require the sites to develop the procedure(s) which specify their  
25 programmatic waste characterization requirements. DOE will evaluate the procedures during  
26 audits conducted under the Audit and Surveillance Program (Section C-5a(3)) and may also  
27 evaluate the procedures as part of the review and approval of the WSPF. Sites must notify the  
28 Permittees and obtain DOE approval prior to making data-affecting modifications to procedures  
29 (Permit Attachment C3, Section C3-15). Program procedures shall address the following  
30 minimum elements:

- 31 • Waste characterization and certification procedures for retrievably stored and newly  
32 generated wastes to be sent to the WIPP facility
- 33 • Methods used to ensure prohibited items are documented and managed. These will  
34 include procedures for performing radiography, VE, or treatment, if these methods are  
35 used to ensure prohibited items are not present in the waste prior to shipment of the  
36 waste to WIPP.
- 37 • Procedures used to verify packaging configurations to determine the correct drum age  
38 criteria (**DAC**) if headspace gas sampling and analysis is used to collect waste  
39 characterization information per Section C1-1a(1) of the WAP.

- 1       • Identify the organization(s) responsible for compliance with waste characterization and  
2       certification procedures.
- 3       • Identify the oversight procedures and frequency of actions to verify compliance with  
4       waste characterization and certification procedures.
- 5       • Develop training specific to waste characterization and certification procedures.
- 6       • Ensure that personnel may stop work if noncompliance with waste characterization or  
7       certification procedures is identified.
- 8       • Develop a nonconformance process that complies with the requirements in Permit  
9       Attachment C3 of the WAP to document and establish corrective actions.
- 10      • As part of the corrective action process, assess the potential time frame of the  
11      noncompliance, the potentially affected waste population(s), and the reassessment  
12      and recertification of those wastes.
- 13      • A listing of all approved hazardous waste numbers which are acceptable at WIPP are  
14      included in Table C-9.

15 For those waste streams or containers that are not amenable to radiography (e.g., RH TRU  
16 mixed waste, direct loaded ten-drum overpacks (**TDOPs**)) for waste confirmation by the  
17 Permittees pursuant to Permit Attachment C7, generator/storage site VE data may be used for  
18 waste acceptance. In those cases, the Permittees will review the generator/storage site VE  
19 procedures to ensure that data sufficient for the Permittees' waste acceptance activities  
20 pursuant to Permit Attachment C7 will be obtained and the procedures meet the minimum  
21 requirements for visual examination specified in Permit Attachment C1, Section C1-3.

22 The following waste characterization parameters shall be obtained from the generator/storage  
23 sites:

- 24       • Determination whether TRU mixed waste streams comply with the applicable  
25       provisions of the TSDF-WAC
- 26       • Determination whether TRU mixed wastes exhibit a hazardous characteristic  
27       (20.4.1.200 NMAC, incorporating 40 CFR §261 Subpart C)
- 28       • Determination whether TRU mixed wastes are listed (20.4.1.200 NMAC, incorporating  
29       40 CFR §261 Subpart D)
- 30       • Estimation of waste material parameter weights

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

1 C-3 Generator Waste Characterization Methods

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

7 C-3a Sampling and Analytical Methods

8 C-3a(1) Headspace Gas Sampling and Analysis

9 Representative headspace gas sampling and analysis shall be used by generator/storage sites  
10 to determine the types and concentrations of VOCs in the void volume of randomly selected  
11 waste containers in order to resolve the assignment of EPA hazardous waste numbers for those  
12 debris waste streams for which an AK Sufficiency Determination Request has not been  
13 approved by DOE. In addition, VOC constituents will be compared to those assigned by  
14 acceptable knowledge, which may include an analysis of radiolytically derived VOCs. The  
15 generator/storage sites may also consider radiolysis and packaging materials when assessing  
16 the presence of hazardous constituents in the headspace gas results, and whether radiolysis  
17 would generate wastes which exhibit the toxicity characteristic. Refer to Permit Attachment C4  
18 for additional clarification regarding hazardous waste number assignment and headspace gas  
19 results. The methods for random selection of containers for headspace gas sampling and  
20 analysis are specified in Permit Attachment C2. Headspace gas sampling and analysis shall be  
21 subject to the Audit and Surveillance Program (Permit Attachment C6).

22 In accordance with EPA convention, identification of hazardous constituents detected by gas  
23 chromatography/mass spectrometry methods that are not on the list of target analytes shall be  
24 reported. These compounds are reported as tentatively identified compounds (**TICs**) in the  
25 analytical BDR and shall be added to the target analyte list if detected in a given waste stream,  
26 if they appear in the 20.4.1.200 NMAC (incorporating 40 CFR §261) Appendix VIII, and if they  
27 are reported in 25% of the waste containers sampled from a given waste stream. The  
28 headspace gas analysis method Quality Assurance Objectives (**QAOs**) are specified in Permit  
29 Attachment C3.

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

31 Representative homogeneous and soil/gravel waste sampling and analysis shall be used by  
32 generator/storage sites to resolve the assignment of EPA hazardous waste numbers for  
33 homogeneous and soil/gravel waste streams for which an AK Sufficiency Determination  
34 Request has not been approved by DOE. Sampling of homogeneous and soil/gravel wastes  
35 shall result in the collection of a sample that is used to resolve the assignment of hazardous  
36 waste numbers. Sampling is accomplished through coring or other EPA approved sampling,  
37 which is described in Permit Attachment C1. For those waste streams defined as Summary  
38 Category Groups S3000 or S4000 on page C-3, debris that may also be present within these  
39 wastes need not be sampled. The waste containers for sampling and analysis are to be  
40 selected randomly from the population of containers for the waste stream. The random selection  
41 methodology is specified in Permit Attachment C2. Homogeneous and soil/gravel sampling and  
42 analysis shall be subject to the Audit and Surveillance Program (Permit Attachment C6).

1 Totals or TCLP analyses for VOCs, SVOCs, and RCRA-regulated metals are used to determine  
2 waste parameters in soils/gravels and solids that may be important to the performance within  
3 the disposal system (Tables C-3 and C-4). To determine if a waste exhibits a toxicity  
4 characteristic for compounds specified in 20.4.1.200 NMAC (incorporating 40 CFR §261,  
5 Subpart C), TCLP may be used instead of total analyses. The generator will use the results from  
6 these analyses to determine if a waste exhibits a toxicity characteristic. The mean concentration  
7 of toxicity characteristic contaminants are calculated for each waste stream such that it can be  
8 reported with an upper 90 percent confidence limit (**UCL<sub>90</sub>**). The UCL<sub>90</sub> values for the mean  
9 measured contaminant concentrations in a waste stream will be compared to the specified  
10 regulatory levels in 20.4.1.200 NMAC (incorporating 40 CFR §261 Subpart C), expressed as  
11 total/TCLP values, to determine if the waste stream exhibits a toxicity characteristic. A  
12 comparison of total analyses and TCLP analyses is presented in Appendix C3 of the WIPP  
13 RCRA Part B Permit Application (DOE, 1997), and a discussion of the UCL<sub>90</sub> is included in  
14 Permit Attachment C2. If toxicity characteristic (**TC**) wastes are identified, these will be  
15 compared to those determined by acceptable knowledge and TC waste numbers will be revised,  
16 as warranted. Refer to Permit Attachment C4 for additional clarification regarding hazardous  
17 waste number assignment and homogeneous solid and soil/gravel analytical results.

#### 18 C-3a(3) Laboratory Qualification

19 DOE will ensure that generator/storage sites conduct analyses using laboratories that are  
20 qualified through participation in the Performance Demonstration Program (**PDP**) (DOE, 2003,  
21 2005). Required QAOs are specified in Permit Attachment C3. In addition, methods and  
22 supporting performance data demonstrating QAO compliance shall be ensured by DOE during  
23 the annual certification audit of the laboratories.

24 Analytical methods used by the laboratories shall: 1) satisfy all of the appropriate QAOs, and 2)  
25 be implemented through laboratory-documented standard operating procedures. These  
26 analytical QAOs are discussed in detail in Permit Attachment C3.

#### 27 C-3b Acceptable Knowledge

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

- 29 • To delineate TRU mixed waste streams
- 30 • To assess whether TRU mixed wastes comply with the TSDF-WAC
- 31 • To assess whether TRU mixed wastes exhibit a hazardous characteristic (20.4.1.200  
32 NMAC, incorporating 40 CFR §261 Subpart C)
- 33 • To assess whether TRU mixed wastes are listed (20.4.1.200 NMAC, incorporating 40  
34 CFR §261 Subpart D)
- 35 • To estimate waste material parameter weights

36 Acceptable knowledge is discussed in detail in Permit Attachment C4, which outlines the  
37 minimum set of requirements and DQOs which shall be met by the generator/storage sites in  
38 order to use acceptable knowledge. In addition, Section C-5a(3) of this permit attachment

1 describes the assessment of acceptable knowledge through the Audit and Surveillance  
2 Program.

### 3 C-3c Radiography and Visual Examination

4 Radiography and visual examination (**VE**) are nondestructive qualitative and quantitative  
5 techniques used to identify and verify waste container contents as specified in Permit  
6 Attachment C1. Generator/storage sites shall perform radiography or VE of 100 percent of CH  
7 TRU mixed waste containers in waste streams except for those waste streams for which DOE  
8 approves a Scenario 1 or Scenario 2 Determination Request. No RH TRU mixed waste will be  
9 shipped to WIPP for storage or disposal without documentation of radiography or VE of 100  
10 percent of the containers as specified in Permit Attachment C1. Radiography and/or VE will be  
11 used, when necessary, to examine a waste container to verify its physical form. These  
12 techniques can detect observable liquid in excess of TSDF-WAC limits and containerized  
13 gases, which are prohibited for WIPP disposal. The prohibition of liquid in excess of TSDF-WAC  
14 limits and containerized gases prevents the shipment of corrosive, ignitable, or reactive wastes.  
15 Radiography and/or VE are also able to verify that the physical form of the waste matches its  
16 waste stream description (i.e. Homogeneous Solids, Soil/Gravel, or Debris Waste [including  
17 uncategorized metals]). If the physical form does not match the waste stream description, the  
18 waste will be designated as another waste stream and assigned the preliminary hazardous  
19 waste numbers associated with that new waste stream assignment. That is, if radiography  
20 and/or VE indicates that the waste does not match the waste stream description arrived at by  
21 acceptable knowledge characterization, a non-conformance report (**NCR**) will be completed and  
22 the inconsistency will be resolved as specified in Permit Attachment C4, and the NCR will be  
23 dispositioned as specified in Permit Attachment C3, Section C3-13. The proper waste stream  
24 assignment will be determined (including preparation of a new WSPF), the correct hazardous  
25 waste numbers will be assigned, and the resolution will be documented. Refer to Permit  
26 Attachment C4 for a discussion of acceptable knowledge and its verification process.

27 For generator/storage sites that use VE, the detection of any liquid in non-transparent internal  
28 containers, detected from shaking the internal container, will be handled by assuming that the  
29 internal container is filled with liquid and adding this volume to the total liquid in the container  
30 being characterized using VE. The container being characterized using VE would be rejected  
31 and/or repackaged to exclude the internal container if it is over the TSDF-WAC limits. When  
32 radiography is used, or visual examination of transparent containers is performed, if any liquid in  
33 internal containers is detected, the volume of liquid shall be added to the total for the container  
34 being characterized using radiography or VE. Radiography, or the equivalent, will be used as  
35 necessary on the existing/stored waste containers to verify the physical characteristics of the  
36 TRU mixed waste correspond with its waste stream identification/waste stream Waste Matrix  
37 Code and to identify prohibited items. Radiographic examination protocols and QA/QC methods  
38 are provided in Permit Attachment C1. Radiography and VE shall be subject to the Audit and  
39 Surveillance Program (Permit Attachment C6).

### 40 C-3d Characterization Techniques and Frequency for Newly Generated and Retrievably 41 Stored Waste

42 Generator/storage sites will use acceptable knowledge to delineate all TRU mixed waste  
43 containers into waste streams for the purposes of grouping waste for further characterization.  
44 The analyses performed may differ based on the waste stream and the physical form of the  
45 waste (i.e., heterogeneous debris waste cannot be sampled for totals analyses). Both

1 retrievably stored and newly generated wastes will be delineated in this fashion, though the  
2 types of acceptable knowledge used may differ. Section C-3b discusses the use of acceptable  
3 knowledge, sampling, and analysis in more detail. Acceptable knowledge is discussed more  
4 completely in Permit Attachment C4. Every TRU mixed waste stream will be assigned  
5 hazardous waste numbers based upon acceptable knowledge, and the generator/storage sites  
6 may resolve the assignment of hazardous waste numbers using headspace gas (Summary  
7 Category Group S5000 only) and solid sampling and analysis (Summary Category Groups  
8 S3000 and S4000 only).

9 In the CIS for each waste stream, the generator/storage site will be required to document their  
10 methods, and the findings from those methods, for determining the physical form of the waste  
11 and the presence or absence of prohibited items for both retrievably stored and newly  
12 generated waste. Radiography and/or VE may be used to verify the physical form of retrievably  
13 stored TRU mixed waste. For newly generated waste, physical form and prohibited items may  
14 either be documented during packaging using VE or verified after packaging using radiography  
15 or VE.

16 For debris waste streams that do not have an AK Sufficiency Determination approved by DOE,  
17 containers selected in accordance with Permit Attachment C2 from those waste streams must  
18 be sampled and analyzed for VOCs in the headspace gas. Likewise, a statistically selected  
19 portion of homogeneous solids and soil/gravel waste streams must be sampled and analyzed  
20 for RCRA-regulated total VOCs, SVOCs, and metals when those waste streams do not have an  
21 AK Sufficiency Determination approved by DOE. Sampling and analysis methods used for  
22 waste characterization are discussed in Section C-3a.

23 In the process of performing organic headspace and solid sample analyses, nontarget  
24 compounds may be identified. These compounds will be reported as TICs. TICs reported in  
25 25% of the samples and listed in 20.4.1.200 NMAC (incorporating 40 CFR §261) Appendix VIII,  
26 will be compared with acceptable knowledge data to determine if the TIC is in a listed  
27 hazardous waste in the waste stream. TICs identified through headspace gas analyses that  
28 meet the Appendix VIII list criteria and the 25 percent reporting criteria for a waste stream will  
29 be added to the headspace gas waste stream target list, regardless of the hazardous waste  
30 listing associated with the waste stream. TICs subject to inclusion on the target analyte list that  
31 are toxicity characteristic parameters shall be added to the target analyte list regardless of origin  
32 because the hazardous waste designation for these numbers is not based on source. However,  
33 for toxicity characteristic and non-toxic F003 constituents, the site may take concentration into  
34 account when assessing whether to add a hazardous waste number. TICs reported from the  
35 Totals VOC or SVOC analyses may be excluded from the target analyte list for a waste stream  
36 if the TIC is a constituent in an F-listed waste whose presence is attributable to waste packaging  
37 materials or radiolytic degradation from acceptable knowledge documentation. If the TIC  
38 associated with a total VOC or SVOC analysis cannot be identified as a component of waste  
39 packaging materials or as a product of radiolysis, the generator/storage site will add these TICs  
40 to the list of hazardous constituents for the waste stream (and assign additional EPA listed  
41 hazardous waste numbers, if appropriate). A permit modification will be submitted to NMED for  
42 their approval to add these constituents (and waste numbers), if necessary. For toxicity  
43 characteristic compounds and non-toxic F003 constituents, the generator/storage site may  
44 consider waste concentration when determining whether to change a hazardous waste number.  
45 Refer to Permit Attachment C3 for additional information on TIC identification.

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

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

10 WIPP may accept TRU mixed waste that has been repackaged or treated. Treated waste shall  
11 retain the original waste stream's listed hazardous waste number designation.

### 12 C-3d(1) Newly Generated Waste

13 The RCRA-regulated constituents in newly generated wastes will typically be documented at the  
14 time of generation based on acceptable knowledge for the waste stream. Newly generated TRU  
15 mixed waste characterization typically begins with verification that processes generating the  
16 waste have operated within established written procedures. Waste containers are delineated  
17 into waste streams using acceptable knowledge. The Permittees will require that the  
18 generator/storage sites document the methods used to delineate waste streams in the  
19 acceptable knowledge record and Acceptable Knowledge Summary Report. Determination that  
20 the physical form of the waste (Summary Category Group) corresponds to the physical form of  
21 the assigned waste stream may be accomplished either using VE during packaging or by  
22 performing radiography as specified in Permit Attachment C1, Section C1-3 for retrievably  
23 stored waste. Instead of using a video/audio tape and a single operator, the VE method for  
24 newly generated waste (or repackaged retrievably stored waste) may use a second operator,  
25 who is equally trained to the requirements stipulated in Permit Attachment C1, to provide  
26 additional verification by reviewing the contents of the waste container to ensure correct  
27 reporting. If the second operator cannot provide concurrence, corrective actions<sup>2</sup> will be taken  
28 as specified in Permit Attachment C3. The subsequent waste characterization activities depend  
29 on the assigned Summary Category Group, since waste within the Homogeneous Solids and  
30 Soils/Gravel Summary Category Groups may be characterized using different techniques than  
31 the waste in the Debris Waste Summary Category Group. The packaging configuration, type  
32 and number of filters, and rigid liner vent hole presence and diameter necessary to determine  
33 the appropriate drum age criteria (DAC) in accordance with Permit Attachment C1, Section C1-  
34 1, may be documented as part of the characterization information collected during the  
35 packaging of newly generated waste or repackaging of retrievably stored waste for those  
36 containers of debris waste that will undergo headspace gas sampling and analysis.

### 37 C-3d(1)(a) Sampling of Newly Generated Homogeneous Solids and Soil/Gravel

38 When a Determination Request has not been approved by DOE, sampling and analysis of  
39 newly generated homogeneous solid and soil/gravel waste streams shall be conducted in  
40 accordance with the requirements specified in Permit Attachment C1, Section C1-2. The

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<sup>2</sup> "Corrective action" as used in this WAP and its attachments does not mean corrective action as defined under HWA, RCRA, and their implementing regulations.

1 number of newly generated homogeneous solid and soil/gravel waste containers to be sampled  
2 will be determined using the procedure specified in Section C2-1, wherein a statistically selected  
3 portion of the waste will be sampled.

#### 4 C-3d(2) Retrievably Stored Waste

5 All retrievably stored waste containers will first be delineated into waste streams using  
6 acceptable knowledge. The Permittees will require that the generator/storage sites document  
7 the methods used to delineate waste streams in the acceptable knowledge record and  
8 Acceptable Knowledge Summary Report. Retrievably stored waste containers may be  
9 examined using radiography or VE to determine the physical waste form (Summary Category  
10 Group), the absence of prohibited items, and additional waste characterization techniques that  
11 may be used based on the Summary Category Groups (i.e., S3000, S4000, S5000).

12 The headspace gas sampling method provided in Permit Attachment C1 will be used, when  
13 necessary, to resolve the assignment of EPA hazardous waste numbers to debris waste  
14 streams, as specified in Permit Attachment C4.

15 A statistically selected portion of retrievably stored homogeneous solids and soil/gravel wastes  
16 will be sampled and analyzed for total VOCs, SVOCs, and metals, when necessary. The sample  
17 location selection method is described in Permit Attachment C2. The sampling methods for  
18 these wastes are provided in Permit Attachment C1.

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

25 Representativeness of containers selected for headspace gas sampling and waste subjected to  
26 homogeneous solids and soil/gravel sampling and analysis will be validated by the  
27 generator/storage site and by DOE during an audit (Permit Attachment C6) via examination of  
28 documentation that shows that random samples were collected. (Because representativeness is  
29 a quality characteristic that expresses the degree to which a sample or group of samples  
30 represent the population being studied, the random sampling of waste streams ensures  
31 representativeness.)

#### 32 C-4 Data Verification and Quality Assurance

33 The Permittees will ensure that applicable waste characterization processes performed by  
34 generator/storage sites sending TRU mixed waste to the WIPP for disposal meets WAP  
35 requirements through data validation, usability and reporting controls. Verification occurs at  
36 three levels: 1) the data generation level, 2) the project level, and 3) the Permittee level. The  
37 validation and verification process and requirements at each level are described in Permit  
38 Attachment C3, Section C3-10. The validation and verification process at the Permittee Level is  
39 also described in Section C-5.

1 C-4a Data Generation and Project Level Verification Requirements

2 C-4a(1) Data Quality Objectives

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

- 8 • Acceptable Knowledge
  - 9 – To delineate TRU mixed waste streams.
  - 10 – To assess whether TRU mixed wastes comply with the applicable requirements of  
11 the TSDF-WAC.
  - 12 – To assess whether TRU mixed wastes exhibit a hazardous characteristic  
13 (20.4.1.200 NMAC, incorporating 40 CFR §261 Subpart C).
  - 14 – To assess whether TRU mixed wastes are listed (20.4.1.200 NMAC, incorporating  
15 40 CFR §261, Subpart D).
  - 16 – To estimate waste material parameter weights.
- 17 • Headspace-Gas Sampling and Analysis
  - 18 – To identify VOCs and quantify the concentrations of VOC constituents in waste  
19 containers to resolve the assignment of EPA hazardous waste numbers
- 20 • Homogeneous Waste Sampling and Analysis
  - 21 – To compare UCL<sub>90</sub> values for the mean measured contaminant concentrations in a  
22 waste stream with specified toxicity characteristic levels in 20.4.1.200 NMAC  
23 (incorporating 40 CFR §261), to determine if the waste is hazardous, and to  
24 resolve the assignment of EPA hazardous waste numbers.
- 25 • Radiography
  - 26 – To determine the physical waste form, the absence of prohibited items, and  
27 additional waste characterization techniques that may be used based on the  
28 Summary Category Groups (i.e., S3000, S4000, S5000).
- 29 • Visual Examination
  - 30 – To determine the physical waste form, the absence of prohibited items, and  
31 additional waste characterization techniques that may be used based on the  
32 Summary Category Groups (i.e., S3000, S4000, S5000).

1 Reconciliation of these DQOs by the Generator/Storage Site Project Manager or DOE approved  
2 laboratories, as applicable, is addressed in Permit Attachment C3. Reconciliation requires  
3 determining whether sufficient type, quality, and quantity of data have been collected to ensure  
4 the DQOs cited above can be achieved.

#### 5 C-4a(2) Quality Assurance Objectives

6 The generator/storage sites or DOE approved laboratories, as applicable, shall demonstrate  
7 compliance with each QAO associated with the various characterization methods as presented  
8 in Permit Attachment C3. Generator/Storage Site Project Managers or DOE approved  
9 laboratories, as applicable, are further required to perform a reconciliation of the data with the  
10 DQOs established in this WAP. The Generator/Storage Site Project Manager or DOE approved  
11 laboratories, as applicable, shall conclude that all of the DQOs have been met for the  
12 characterization of the waste stream prior to submitting a WSPF to DOE for approval (Permit  
13 Attachment C3). The following QAO elements shall be considered for each technique, as a  
14 minimum:

- 15 • Precision

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

- 17 • Accuracy

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

- 20 • Completeness

- 21 – Completeness is a measure of the amount of valid data obtained from a method  
22 compared to the total amount of data obtained that is expressed as a percentage.

- 23 • Comparability

- 24 – Comparability is the degree to which one data set can be compared to another.

- 25 • Representativeness

- 26 – Representativeness expresses the degree to which data represent characteristics  
27 of a population.

28 A more detailed discussion of the QAOs, including a mathematical representation, where  
29 appropriate, can be found in Permit Attachment C3, which describes the QAOs associated with  
30 each method of sampling and analysis.

#### 31 C-4a(3) Sample Control

32 The generator/storage sites and DOE approved laboratories, as applicable, will implement a  
33 sample handling and control program that will include the maintenance of field documentation  
34 records, proper labeling, and a chain of custody (**COC**) record. The generator/storage site and  
35 DOE approved laboratories, as applicable, Quality Assurance Project Plan (**QAPjP**) or

1 procedures referenced in the QAPjP will document this program and include COC forms to  
2 control the sample from the point of origin to the final analysis result reporting. DOE will review  
3 and approve the QAPjP, including their determination that the sample control program is  
4 adequate. The approved QAPjP will be provided to NMED prior to shipment of TRU mixed  
5 waste and before the generator/storage site audit, as specified in Permit Attachment C5. Details  
6 of this sample control program are provided in Permit Attachment C1 and are summarized  
7 below to include:

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

#### 15 C-4a(4) Data Generation

16 BDRs, in a format approved by DOE, will be used by each generator/storage site and DOE  
17 approved laboratories, as applicable, for reporting waste characterization data. This format will  
18 be included in the generator/storage site and DOE approved laboratories, as applicable, QAPjP,  
19 controlled electronic databases, or procedures referenced in the QAPjP (Permit Attachment C5)  
20 and will include all of the elements required by this WAP for BDR (Permit Attachment C3).

21 DOE shall perform audits of the generator/storage site waste characterization programs, as  
22 implemented by the generator/storage site QAPjP, to verify compliance with the WAP and the  
23 DQOs in this WAP (See Permit Attachment C6 for a discussion of the content of the audit  
24 program). The primary functions of these audits are to review generator/storage sites'  
25 adherence to the requirements of this WAP and ensure adherence to the WAP characterization  
26 program. DOE shall provide the results of each audit to NMED. If audit results indicate that a  
27 generator/storage site is not in compliance with the requirements of this WAP, DOE will take  
28 appropriate action as specified in Permit Attachment C6.

29 DOE shall perform audits of the DOE approved laboratory's programs, as implemented by the  
30 laboratory's QAPjP (See Permit Attachment C6 for a discussion of the content of the audit  
31 program). The primary functions of these audits are to review the DOE approved laboratory's  
32 adherence to the requirements of this WAP. DOE shall provide the results of each audit to  
33 NMED. If audit results indicate that a DOE approved laboratory is not in compliance with the  
34 requirements of this WAP, DOE will take appropriate action as specified in Permit Attachment  
35 C6.

36 DOE shall further require all DOE approved laboratories analyzing WIPP waste samples for the  
37 generator/storage sites to have established, documented QA/QC programs. DOE annually  
38 evaluates these laboratories and their QA/QC programs as part of their participation in DOE's  
39 PDP laboratory performance program. DOE's audits cover the requirements of the lab's QA/QC  
40 program, as well as compliance with this WAP. Continued compliance with these parameters  
41 will be verified by ongoing audits by DOE at the generator/storage sites and these laboratories

1 as specified in Permit Attachment C6. DOE's audits of the generator/storage sites will verify that  
2 the laboratories analyzing the sites' waste have been properly audited by the generator/storage  
3 sites. The laboratory's QA/QC program shall include the following:

- 4 • Facility organization
- 5 • A list of equipment/instrumentation
- 6 • Operating procedures
- 7 • Laboratory QA/QC procedures
- 8 • Quality assurance review
- 9 • Laboratory records management

#### 10 C-4a(5) Data Verification

11 BDRs will document the testing, sampling, and analytical results from the required  
12 characterization activities, and document required QA/QC activities. Data validation and  
13 verification at both the data-generation level and the project level will be performed as required  
14 by this Permit before the required data are transmitted to the Permittees (Permit Attachment  
15 C3). NMED may request, through the Permittees, copies of any BDR, and/or the raw data  
16 validated by the generator/storage sites, to check DOE's audit of the validation process.

#### 17 C-4a(6) Data Transmittal

18 BDRs will include the information required by Section C3-10 and will be transmitted by hard  
19 copy or electronically (provided a hard copy is available on demand) from the data generation  
20 level to the project level.

21 The generator/storage site will transmit waste container information electronically via the WIPP  
22 Waste Information System (**WWIS**). Data will be entered into the WWIS in the exact format  
23 required by the database. Refer to Section C-5a(1) for WWIS reporting requirements and the  
24 *Waste Data System User's Manual* (DOE, 2009) for the WWIS data fields and format  
25 requirements.

26 Once a waste stream is characterized, the Site Project Manager will also submit to the  
27 Permittees a WSPF (Figure C-1) accompanied by the CIS for that waste stream which includes  
28 reconciliation with DQOs (Sections 3 C-12b(1) and C3-12b(2)). The WSPF, the CIS, and  
29 information from the WWIS will be used as the basis for acceptance of waste characterization  
30 information on TRU mixed wastes to be disposed of at the WIPP.

#### 31 C-4a(7) Records Management

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

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

8 Records that are designated as Lifetime Records shall be maintained for the life of the waste  
9 characterization program at a participating generator/storage site plus six years or transferred  
10 for permanent archival storage to the WIPP Records Archive facility.

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

## 22 C-5 Permittee Level Waste Screening and Verification of TRU Mixed Waste

23 Permittee waste screening is a two-phased process. Phase I will occur prior to configuring  
24 shipments of TRU mixed waste. Phase II will occur after configuration of shipments of TRU  
25 mixed waste but before it is disposed at the WIPP facility. Figure C-3 presents Phase I and a  
26 portion of Phase II of the TRU mixed waste screening process. Permit Attachment C7 presents  
27 the TRU mixed waste confirmation portion of Phase II activities.

### 28 C-5a Phase I Waste Stream Screening and Verification

29 The first phase of the waste screening and verification process will occur before TRU mixed  
30 waste is shipped to the WIPP facility. Before the Permittees begin the process of accepting TRU  
31 mixed waste from a generator/storage site, an initial audit of that generator/storage site will be  
32 conducted as part of the Audit and Surveillance Program (Permit Attachment C6). The RCRA  
33 portion of the generator/storage site audit program will provide on-site verification of  
34 characterization procedures; BDR preparation; and recordkeeping to ensure that all applicable  
35 provisions of the WAP requirements are met. Another portion of the Phase I verification is the  
36 WSPF approval process. At the WIPP facility, this process includes verification that all of the  
37 required elements of the WSPF and the CIS are present (Permit Attachment C3) and that the  
38 waste characterization information meet acceptance criteria required for compliance with the  
39 WAP (Section C3-12b(1)).

40 A generator/storage site must first prepare a QAPjP, which includes applicable WAP  
41 requirements, and submit it to DOE for review and approval (Permit Attachment C5). Once  
42 approved, a copy of the QAPjP is provided to NMED for examination. The generator/storage  
43 site will implement the specific parameters of the QAPjP after it is approved. An initial audit will

1 be performed after QAPjP implementation and prior to the generator/storage site being certified  
2 for shipment of waste to WIPP. Additional audits, focusing on the results of waste  
3 characterization, will be performed at least annually. DOE has the right to conduct unannounced  
4 audits and to examine any records that are related to the scope of the audit. See Section C-  
5 5a(3) and Permit Attachment C6 for further information regarding audits.

6 When the required waste stream characterization data have been collected by a  
7 generator/storage site and the initial generator/storage site audit has been successfully  
8 completed, the generator/storage Site Project Manager will verify that waste stream  
9 characterization meets the applicable WAP requirements as a part of the project level  
10 verification (Section C3-10b). If the waste characterization does not meet the applicable  
11 requirements of the WAP, the mixed waste stream cannot be managed, stored, or disposed at  
12 WIPP until those requirements are met. The Site Project Manager will then complete a WSPF  
13 and submit it to the Permittees, along with the accompanying CIS for that waste stream (Section  
14 C3-12b(1)). All data necessary to check the accuracy of the WSPF will be transmitted to the  
15 Permittees for verification. This provides notification that the generator/storage site considers  
16 that the waste stream (identified by the waste stream identification number) has been  
17 adequately characterized for disposal prior to shipment to WIPP. The Permittees will compare  
18 headspace gas, radiographic, visual examination and solid sampling/analysis data obtained  
19 subsequent to submittal and approval of the WSPF (and prior to submittal) with characterization  
20 information presented on this form. If the Permittees determine (through the data comparison)  
21 that the characterization information is adequate, DOE will approve the WSPF. Prior to the first  
22 shipment of containers from the approved waste stream, the approved WSPF and  
23 accompanying CIS will be provided to NMED. If the data comparison indicates that analyzed  
24 containers have hazardous wastes not present on the WSPF, or a different Waste Matrix Code  
25 applies, the WSPF is in error and shall be resubmitted. Ongoing WSPF examination is  
26 discussed in detail in Section C-5a(2).

27 Audits of generator/storage sites will be conducted as part of the Audit and Surveillance  
28 Program (Permit Attachment C6). The RCRA portion of the generator/storage site audit program  
29 will provide on-site verification of waste characterization procedures; BDR preparation; and  
30 record keeping to ensure that all applicable provisions of the WAP requirements are met. As  
31 part of the waste characterization data submittal, the generator/storage site will also transmit the  
32 data on a container basis via the WWIS. This data submittal can occur at any time as the data  
33 are being collected, but will be complete for each container prior to shipment of that container.  
34 The WWIS will conduct internal edit/limit checks as the data are entered, and the data will be  
35 available to the Permittees as supporting information for WSPF review. NMED will have read-  
36 only access to the WWIS as necessary to determine compliance with the WAP. The initial  
37 WSPF check performed by the Permittees will include WWIS data submitted by the  
38 generator/storage site for each waste container submitted for the WSPF review and the CIS.  
39 The Permittees will compare ongoing sampling/analysis characterization data obtained and  
40 submitted via the WWIS to the approved WSPF. If this comparison shows that containers have  
41 hazardous wastes not reported on the WSPF, or a different Waste Matrix Code applies, the data  
42 are rejected and the waste containers are not accepted for shipment until a new or revised  
43 WSPF is submitted to the Permittees and approved by DOE.

44 If discrepancies regarding hazardous waste number assignment or Waste Matrix Code  
45 designation arise as a result of the Phase I review, the generator/storage sites will be contacted  
46 by the Permittees and required to provide the necessary additional information to resolve the  
47 discrepancy before that waste stream is approved for disposal at the WIPP facility. If the

1 discrepancy is not resolved, the waste stream will not be approved. DOE will notify NMED in  
2 writing of any discrepancies identified during WSPF review and the resulting discrepancy  
3 resolution prior to waste shipment. The Permittees will not manage, store, or dispose the waste  
4 stream until this discrepancy is resolved in accordance with this WAP.

5 C-5a(1) WWIS Description

6 All generator/storage sites planning to ship TRU mixed waste to WIPP will supply the required  
7 data to the WWIS. The WWIS Data Dictionary includes all of the data fields, the field format and  
8 the limits associated with the data as established by this WAP. These data will be subjected to  
9 edit and limit checks that are performed automatically by the database, as defined in the *Waste*  
10 *Data System User's Manual* (DOE, 2009).

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

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

32 The WWIS will generate the following:

- 33
- Waste Emplacement Report

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

1           • Shipment Summary Report

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

7           • Waste Container Data Report

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

13          • Reports of Change Log

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

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

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

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

31          C-5a(2) Examination of the Waste Stream Profile Form and Container Data Checks

32          The Permittees will verify the completeness and accuracy of the Waste Stream Profile Form  
33          (Section C3-12b(1)). Figure C-2 includes the waste characterization and waste stream approval  
34          process. The assignment of the waste stream description, Waste Matrix Code Group, and  
35          Summary Category Groups; the results of waste analyses, as applicable; the acceptable  
36          knowledge summary documentation; the methods used for characterization; the DOE  
37          certification, and appropriate designation of EPA hazardous waste number(s) will be examined  
38          by the Permittees. If the WSPF is inaccurate, efforts will be made to resolve discrepancies by  
39          contacting the generator/storage site in order for the waste stream to be eligible for shipment to  
40          the WIPP facility. If discrepancies in the waste stream are detected at the generator/storage

1 site, the generator/storage site will implement a non-conformance program to identify,  
2 document, and report discrepancies (Permit Attachment C3).

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

6 The EPA hazardous waste numbers for the wastes that appear on the Waste Stream Profile  
7 Form will be compared to those in Table C-9 to ensure that only approved wastes are accepted  
8 for management, storage, or disposal at WIPP. Some of the waste may also be identified by  
9 unique state hazardous waste codes or numbers. These wastes are acceptable at WIPP as  
10 long as the TSDF-WAC are met. The CIS will be reviewed by the Permittees to verify that the  
11 waste has been classified correctly with respect to the assigned EPA hazardous waste  
12 numbers. Any analytical method used will be compared to those listed in Tables C-2, C-3, and  
13 C-4 to ensure that only approved analytical methods were used for analysis of the waste. The  
14 Permittees will verify that the applicable requirements of the TSDF-WAC have been met by the  
15 generator/storage site.

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

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

28 Any container with unresolved discrepancies associated with hazardous waste characterization  
29 will not be managed, stored, or disposed at the WIPP facility until the discrepancies are  
30 resolved. If the discrepancies cannot be resolved, DOE will revoke the approval status of the  
31 waste stream, suspend shipments of the waste stream, and notify NMED. Waste stream  
32 approval will not be reinstated until the generator/storage site demonstrates all corrective  
33 actions have been implemented and the generator/storage site waste characterization program  
34 is reassessed by DOE.

### 35 C-5a(3) Audit and Surveillance Program

36 An important part of the Permittees' verification process is the Audit and Surveillance Program.  
37 The focus of this audit program is compliance with this WAP and the Permit. This audit program  
38 addresses all AK implementation and waste sampling and analysis activities, from waste stream  
39 classification assignment through waste container certification, and ensures compliance with  
40 SOPs and the WAP. Audits will ensure that containers and their associated documentation are  
41 adequately tracked throughout the waste handling process. Operator qualifications will be  
42 verified, and implementation of QA/QC procedures will be surveyed. A final report that includes  
43 generator/storage site or DOE approved laboratory audit results and applicable WAP-related

1 corrective action report (**CAR**) resolution will be provided to NMED for approval, and will be kept  
2 in the WIPP facility operating record until closure of the WIPP facility.

3 DOE will perform an initial audit at each generator/storage site performing waste  
4 characterization activities prior to the formal acceptance of the WSPFs and/or any waste  
5 characterization data supplied by the generator/storage sites. Audits will be performed at least  
6 annually thereafter, including the possibility of unannounced audits (i.e., not a regularly  
7 scheduled audit). These audits will allow NMED to verify that the Permittees have implemented  
8 the WAP and that generator/storage sites have implemented a QA program for the  
9 characterization of waste and meet applicable WAP requirements. DOE will also audit annually  
10 the DOE approved laboratories performing waste sampling and/or analysis. The accuracy of  
11 physical waste description and waste stream assignment provided by the generator/storage site  
12 will be verified by review of the radiography results, and visual examination of data records and  
13 radiography images (as necessary) during audits conducted by DOE. More detail on this audit  
14 process is provided in Permit Attachment C6.

#### 15 C-5b Phase II Waste Shipment Screening and Verification

16 As presented in Figure C-3, Phase II of the waste shipment screening and verification process  
17 begins with confirmation of the waste pursuant to Permit Attachment C7 after waste shipments  
18 are configured. After the waste shipment has arrived, the Permittees will screen the shipments  
19 to determine the completeness and accuracy of the EPA Hazardous Waste Manifest and the  
20 land disposal restriction notice completeness. The Permittees will verify there are no waste  
21 shipment irregularities and the waste containers are in good condition. Only those waste  
22 containers that are from shipments that have been confirmed pursuant to Permit Attachment C7  
23 and that pass all Phase II waste screening and verification determinations will be emplaced at  
24 WIPP. For each container shipped, the Permittees shall ensure that the generator/storage sites  
25 provide the following information:

##### 26 Hazardous Waste Manifest Information:

- 27 • Generator/storage site name and EPA ID
- 28 • Generator/storage site contact name and phone number
- 29 • Quantity of waste
- 30 • List of up to six state and/or federal hazardous waste numbers in each line item
- 31 • Listing of all shipping container IDs (Shipping Package serial number)
- 32 • Signature of authorized generator representative

##### 33 Specific Waste Container information:

- 34 • Waste Stream Identification Number
- 35 • List of Hazardous Waste Numbers per Container
- 36 • Certification Data
- 37 • Shipping Data (Assembly numbers, ship date, shipping category, etc.)

38 This information shall also be supplied electronically to the WWIS. The container-specific  
39 information will be supplied electronically as described in Section C-5a(1), and shall be supplied  
40 prior to the Permittees' management, storage, or disposal of the waste.

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

4 C-5b(1) Examination of the EPA Uniform Hazardous Waste Manifest and Associated Waste  
5 Tracking Information

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

12 The WWIS links the bar-coded identification numbers of all containers in a specific waste  
13 shipment to the waste assembly (for 7-packs, 4-packs, 3-packs and 5-drum carriages) and to  
14 the shipment identification number, which is also written on the EPA Hazardous Waste  
15 Manifest.

16 For shipments in the RH-TRU 72B cask, the identification number of the single payload  
17 container is read during cask-to-cask transfer in the Transfer Cell and then checked against the  
18 WWIS database. For shipments in the CNS 10-160B cask, the Permittees will make a  
19 determination of waste shipment completeness by checking the unique identification number  
20 found on each container holding TRU mixed waste in the Hot Cell against the WWIS database  
21 after unloading the cask.

22 Generators electronically transmit the waste shipment information to the WWIS before the TRU  
23 mixed waste shipment is transported. Once a TRU mixed waste shipment arrives, the  
24 Permittees verify the identity of each cask or container (or one container in a bound 7-pack, 4-  
25 pack, or 3-pack) using the data already in the WWIS.

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

- 29 • Package inner containment vessel or shipping cask closure date
- 30 • Package (container or canister) receipt date
- 31 • Overpack identification number (if appropriate)
- 32 • Package (container or canister) emplacement date
- 33 • Package (container or canister) emplacement location

34 Manifest discrepancies will be identified during manifest examination and container bar-code  
35 WWIS data comparison. A manifest discrepancy is a difference between the quantity or type of  
36 hazardous waste designated on the manifest and the quantity or type of hazardous waste the  
37 WIPP facility actually receives. The generator/storage site technical contact (as listed on the  
38 manifest) will be contacted to resolve the discrepancy. If the discrepancy is identified prior to the  
39 containers being removed from the package or shipping cask, the waste will be retained in the  
40 parking area. If the discrepancy is identified after the waste containers are removed from the  
41 package or cask, the waste will be retained in the Waste Handling Building (**WHB**) until the

1 discrepancy is resolved. Errors on the manifest can be corrected by the WIPP facility with a  
2 verbal (followed by a mandatory written) concurrence by the generator/storage site technical  
3 contact. All discrepancies that are unresolved within fifteen (15) days of receiving the waste will  
4 be immediately reported to NMED in writing. Notifications to NMED will consist of a letter  
5 describing the discrepancies, discrepancy resolution, and a copy of the manifest. If the manifest  
6 discrepancies have not been resolved within thirty (30) days of waste receipt, the shipment will  
7 be returned to the generator/storage facility. If it becomes necessary to return waste containers  
8 to the generator/storage site, a new EPA Uniform Hazardous Waste Manifest may be prepared  
9 by the Permittees.

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

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

16 C-5b(2) Examination of the Land Disposal Restriction (LDR) Notice

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

25 Land Disposal Restriction Notice Information:

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

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

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

1 C-5b(3) Verification

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

- 5 • Whether the number and type of containers holding TRU mixed waste match the  
6 information in the WWIS
- 7 • Whether the containers are in good condition

8 The Permittees will verify that the containers (as identified by their container ID numbers) are  
9 the containers for which accepted data already exists in the WWIS. A check will be performed  
10 by the Permittees comparing the data on the WWIS Shipment Summary Report for the  
11 shipment to the actual shipping papers (including the EPA Hazardous Waste Manifest). This  
12 check also verifies that the containers included in the shipment are those for which approved  
13 shipping data already exist in the WWIS Transportation Data Module (Table C-7). For standard  
14 waste boxes (**SWBs**) and ten drum overpacks (**TDOPs**), this check will include comparing the  
15 barcode on the container with the container number on the shipping papers and the data on the  
16 WWIS Shipment Summary Report. For 7-pack assemblies, one of the seven container barcodes  
17 will be read by the barcode reader and compared to the assembly information for this container  
18 on the WWIS Shipment Summary Report. This will automatically identify the remaining six  
19 containers in the assembly. This process enables the Permittees to identify all of the containers  
20 in the assembly with minimum radiological exposure. If all of the container IDs and the  
21 information on the shipping papers agree with the WWIS Shipment Summary Report, and the  
22 shipment was subject to waste confirmation by the Permittees prior to shipment to WIPP  
23 pursuant to Permit Attachment C7, the containers will be approved for storage and disposal at  
24 the WIPP facility.

25 C-6 Permittees' Waste Shipment Screening QA/QC

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

34 C-7 Records Management and Reporting

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

38 All waste characterization data for each TRU mixed waste container transmitted to WIPP shall  
39 be maintained by the Permittees for the active life of the WIPP facility plus two years. The active  
40 life of the WIPP facility is defined as the period from the initial receipt of TRU mixed waste at the  
41 facility until NMED receives certification of final closure of the facility. After their active life, the

1 records shall be retired to the WIPP Records Archive facility and maintained for 30 years. These  
2 records will then be offered to the National Archives. However, this disposition requirement does  
3 not preclude the inclusion of these records in the permanent marker system or other  
4 requirements for institutional control.

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

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

- 10 • Completed WIPP WSPFs and accompanying CIS, including individual container data  
11 as transferred on the WWIS (or received as hard-copy) and any discrepancy-related  
12 documentation as specified in Section C-5a
- 13 • Radiography and visual examination records (data sheets, packaging logs, and video  
14 and audio recordings) of waste confirmation activities
- 15 • Completed Waste Receipt Checklists and discrepancy-related documentation as  
16 specified in Section C-5b
- 17 • WIPP WWIS Waste Emplacement Report as specified in Section C-5a(1)
- 18 • Audit reports and corrective action reports from the Audit and Surveillance Program  
19 audits as specified in Section C-5a(3) and Permit Attachment C6
- 20 • CARs and closure information for corrective actions taken due to nonconforming waste  
21 being identified during waste confirmation by the Permittees

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

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

26 C-7a General Requirements

- 27 • Records shall be legible
- 28 • Corrections shall be made with a single line through the incorrect information, and the  
29 date and initial of the person making the correction shall be added
- 30 • Black ink is encouraged, unless a copy test has been conducted to ensure the other  
31 color ink will copy
- 32 • Use of highlighters on records is discouraged
- 33 • Records shall be reviewed for completeness

- 1           • Records shall be validated by the cognizant manager or designee

2    C-7b Records Storage

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

10   C-8 Reporting

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

1 C-9 List of References

2 U.S. Department of Energy (DOE), 2009, "Waste Data System User's Manual", DOE/WIPP 09-  
3 3427, U.S. Department of Energy.

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

6 U.S. Department of Energy (DOE), 2003, "Performance Demonstration Program Plan for the  
7 Analysis of Simulated Headspace Gases for the TRU Waste Characterization Program," CAO-  
8 95-1076, Current Revision, Carlsbad, New Mexico, Carlsbad Field Office, U.S. Department of  
9 Energy.

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

13 U.S. Environmental Protection Agency (EPA), April 1994, "Waste Analysis at Facilities that  
14 Generate, Treat, Store, and Dispose of Hazardous Waste, a Guidance Manual," OSWER  
15 9938.4-03, Office of Solid Waste and Emergency Response, Washington, D.C.

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

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

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TABLES

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**Table C-1**  
**Summary of Hazardous Waste Characterization Requirements for Transuranic Mixed Waste <sup>a</sup>**

Parameter	Techniques and Procedure																																						
<p><b><u>Physical Waste Form</u></b></p> <p><u>Summary</u></p> <table border="0"> <tr> <td><u>Category</u></td> <td><u>Names</u></td> </tr> <tr> <td>S3000</td> <td>Homogeneous Solid</td> </tr> <tr> <td>S4000</td> <td>Soil/Gravel</td> </tr> <tr> <td>S5000</td> <td>Debris Wastes</td> </tr> </table>	<u>Category</u>	<u>Names</u>	S3000	Homogeneous Solid	S4000	Soil/Gravel	S5000	Debris Wastes	<p><b><u>Waste Inspection Procedures</u></b></p> <p>Radiography  Visual Examination  (Permit Attachment C1)</p>																														
<u>Category</u>	<u>Names</u>																																						
S3000	Homogeneous Solid																																						
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<p><b><u>Headspace Gases</u></b></p> <p><b><u>Volatile Organic Compounds</u></b></p> <table border="0"> <tr> <td>Benzene</td> <td><u>Alcohols and Ketones</u></td> </tr> <tr> <td>Bromoform</td> <td>Acetone</td> </tr> <tr> <td>Carbon tetrachloride</td> <td>Butanol</td> </tr> <tr> <td>Chlorobenzene</td> <td>Methanol</td> </tr> <tr> <td>Chloroform</td> <td>Methyl ethyl ketone</td> </tr> <tr> <td>1,1-Dichloroethane</td> <td>Methyl isobutyl ketone</td> </tr> <tr> <td>1,2-Dichloroethane</td> <td></td> </tr> <tr> <td>1,1-Dichloroethylene</td> <td></td> </tr> <tr> <td>(trans)-1,2-Dichloroethylene</td> <td></td> </tr> <tr> <td>Ethyl benzene</td> <td></td> </tr> <tr> <td>Ethyl ether</td> <td></td> </tr> <tr> <td>Methylene chloride</td> <td></td> </tr> <tr> <td>1,1,2,2-Tetrachloroethane</td> <td></td> </tr> <tr> <td>Tetrachloroethylene</td> <td></td> </tr> <tr> <td>Toluene</td> <td></td> </tr> <tr> <td>1,1,1-Trichloroethane</td> <td></td> </tr> <tr> <td>Trichloroethylene</td> <td></td> </tr> <tr> <td>1,1,2-Trichloro-1,2,2-trifluoroethane</td> <td></td> </tr> <tr> <td>Xylenes</td> <td></td> </tr> </table>	Benzene	<u>Alcohols and Ketones</u>	Bromoform	Acetone	Carbon tetrachloride	Butanol	Chlorobenzene	Methanol	Chloroform	Methyl ethyl ketone	1,1-Dichloroethane	Methyl isobutyl ketone	1,2-Dichloroethane		1,1-Dichloroethylene		(trans)-1,2-Dichloroethylene		Ethyl benzene		Ethyl ether		Methylene chloride		1,1,2,2-Tetrachloroethane		Tetrachloroethylene		Toluene		1,1,1-Trichloroethane		Trichloroethylene		1,1,2-Trichloro-1,2,2-trifluoroethane		Xylenes		<p><b><u>Gas Analysis <sup>f</sup></u></b></p> <p>Gas Chromatography /Mass Spectroscopy (GC/MS), EPA TO-14A or TO-15, or modified SW-846 8260  ( Permit Attachment C3 )</p> <p>GC/Flame Ionization Detector (FID), for alcohols and ketones, SW-846 8015  ( Permit Attachment C3 )</p> <p>Fourier Transform Infrared Spectroscopy (FTIRS), SW-846</p>
Benzene	<u>Alcohols and Ketones</u>																																						
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Acetone	Isobutanol																																						
Benzene	Methanol																																						
Bromoform	Methyl ethyl ketone																																						
Butanol	Methylene chloride																																						
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**Table C-1  
 Summary of Hazardous Waste Characterization Requirements for Transuranic Mixed Waste <sup>a</sup>**

Parameter	Techniques and Procedure
<u><b>Total Semivolatile Organic Compounds</b></u> Cresols 1,4-Dichlorobenzene <sup>e</sup> 1,2-Dichlorobenzene <sup>e</sup> 2,4-Dinitrophenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine <sup>e</sup>	<u><b>Total Semivolatile Organic Compound Analysis <sup>g</sup></b></u>  TCLP, SW-846 1311  GC/MS, SW-846 8270 ( Permit Attachment C3 )  Acceptable Knowledge for Summary Category S5000 (Debris Wastes)
<u><b>Total Metals</b></u>  Antimony                      Mercury Arsenic                         Nickel Barium                         Selenium Beryllium                      Silver Cadmium                        Thallium Chromium                      Vanadium Lead                             Zinc	<u><b>Total Metals Analysis <sup>g</sup></b></u>  TCLP, SW-846 1311 ICP- MS, SW-846 6020 , ICP Emission Spectroscopy, SW-846 6010 Atomic Absorption Spectroscopy , SW-846 7000 ( Permit Attachment C3 )  Acceptable Knowledge for Summary Category S5000 (Debris Wastes)

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

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**Table C-2  
 Headspace Target Analyte List and Methods<sup>b</sup>**

Parameter	EPA Specified Analytical Method
Benzene Bromoform Carbon tetrachloride Chlorobenzene Chloroform 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethylene (trans)-1,2-Dichloroethylene Ethyl benzene Ethyl ether 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-14A, TO-15 <sup>a</sup> ; Modified 8260 EPA – Approved FTIRS
Acetone Butanol Methanol Methyl ethyl ketone Methyl isobutyl ketone	EPA: Modified TO-14 A, TO-15 <sup>a</sup> ; Modified 8260 Method 8015 EPA - Approved FTIRS

<sup>a</sup> U.S. Environmental Protection Agency (EPA), 1999, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air – Second Edition (EPA/625/R-96/010b). The most current revision of the specified methods may be used.

<sup>b</sup> Required only for debris waste when required to resolve the assignment of EPA hazardous waste numbers.

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**Table C-3  
 Required Organic Analyses and Test Methods Organized by Organic Analytical Groups<sup>e</sup>**

<b>Organic Analytical Group</b>	<b>Required Organic Analyses</b>	<b>EPA Specified Analytical Method<sup>a,d</sup></b>
Nonhalogenated Volatile Organic Compounds (VOCs)	Acetone Benzene n-Butanol Carbon disulfide Ethyl benzene Ethyl ether Formaldehyde Hydrazine <sup>b</sup> Isobutanol Methanol Methyl ethyl ketone Toluene Xylenes	8015 8260 8315A
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 8260
Semivolatile Organic Compounds (SVOCs)	Cresols (o, m, p) 1,2-Dichlorobenzene <sup>c</sup> 1,4-Dichlorobenzene <sup>c</sup> 2,4-Dinitrophenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine <sup>c</sup>	8270

<sup>a</sup> U.S. Environmental Protection Agency (EPA), 1996, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, Third Edition.

<sup>b</sup> Generator/Storage Sites will have to develop an analytical method for hydrazine. This method will be submitted to DOE for approval.

<sup>c</sup> These compounds may also be analyzed as VOCs by SW-846 Method 8260.

<sup>d</sup> 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.

<sup>e</sup> Required only to resolve the assignment of EPA hazardous waste numbers.

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**Table C-4**  
**Summary of Sample Preparation and Analytical Methods for Metals**

<b>Parameters</b>	<b>EPA-Specified Analytical Methods<sup>a,b,c</sup></b>
Sample Preparation	3051, or equivalent, as appropriate for analytical method
Total Antimony	6010, 6020, 7000, 7010, 7062
Total Arsenic	6010, 6020, 7010, 7061, 7062
Total Barium	6010, 6020, 7000, 7010
Total Beryllium	6010, 6020, 7000, 7010
Total Cadmium	6010, 6020, 7000, 7010
Total Chromium	6010, 6020, 7000, 7010
Total Lead	6010, 6020, 7000, 7010
Total Mercury	7471
Total Nickel	6010, 6020, 7000, 7010
Total Selenium	6010, 7010, 7741, 7742
Total Silver	6010, 6020, 7000, 7010
Total Thallium	6010, 6020, 7000, 7010
Total Vanadium	6010, 7000, 7010
Total Zinc	6010, 6020, 7000, 7010

<sup>a</sup> 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.

<sup>b</sup> 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.

<sup>c</sup> Required only for homogeneous solids and soil/gravel to resolve the assignment of EPA hazardous waste numbers.

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**Table C-5  
 Summary of Parameters, Characterization Methods, and Rationale for Transuranic Mixed Waste**

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
<b>Stored Waste</b>				
S3000-Homogeneous Solids	<ul style="list-style-type: none"> <li>• Solidified inorganics</li> <li>• Salt waste</li> <li>• Solidified organics</li> </ul>	Physical waste form	Acceptable knowledge, radiography, and/or visual examination	<ul style="list-style-type: none"> <li>• Determine waste matrix</li> <li>• Demonstrate compliance with waste acceptance criteria (e.g., no liquid in excess of TSDF-WAC limits, no incompatible wastes, no compressed gases)</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Listed</li> <li>• Characteristic</li> </ul>	Acceptable knowledge or statistical sampling <sup>a</sup> (see Tables C-3 and C-4)	<ul style="list-style-type: none"> <li>• Determine characteristic metals and organics</li> <li>• Resolve the assignment of EPA hazardous waste numbers</li> </ul>
S4000-Soil/Gravel	<ul style="list-style-type: none"> <li>• Contaminated soil/debris</li> </ul>	Physical waste form	Acceptable knowledge, radiography, and/or visual examination	<ul style="list-style-type: none"> <li>• Determine waste matrix</li> <li>• Demonstrate compliance with waste acceptance criteria (e.g., no liquid in excess of TSDF-WAC limits, no incompatible wastes, no compressed gases)</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Characteristic</li> <li>• Listed</li> </ul>	Statistical gas sampling and analysis <sup>a</sup> (see Table C-2)	<ul style="list-style-type: none"> <li>• Resolve the assignment of EPA hazardous waste numbers</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Characteristic</li> </ul>	Acceptable knowledge	<ul style="list-style-type: none"> <li>• Determine characteristic metals and organics</li> </ul>
S5000-Debris Waste	<ul style="list-style-type: none"> <li>• Uncategorized metal (metal waste other than lead/cadmium)</li> <li>• Lead/cadmium waste</li> <li>• Inorganic nonmetal waste</li> <li>• Combustible waste</li> <li>• Graphite waste</li> <li>• Heterogeneous debris waste</li> <li>• Composite filter waste</li> </ul>	Physical waste form	Acceptable knowledge, radiography, and/or visual examination	<ul style="list-style-type: none"> <li>• Determine waste matrix</li> <li>• Demonstrate compliance with waste acceptance criteria (e.g., no liquid in excess of TSDF-WAC limits, no incompatible wastes, no compressed gases)</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Characteristic</li> <li>• Listed</li> </ul>	Statistical gas sampling and analysis <sup>a</sup> (see Table C-2)	<ul style="list-style-type: none"> <li>• Resolve the assignment of EPA hazardous waste numbers</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Characteristic</li> </ul>	Acceptable knowledge	<ul style="list-style-type: none"> <li>• Determine characteristic metals and organics</li> </ul>

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**Table C-5  
 Summary of Parameters, Characterization Methods, and Rationale for Transuranic Mixed Waste (Continued)**

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
<b>Newly Generated Waste</b>				
S3000-Homogeneous Solids	<ul style="list-style-type: none"> <li>• Solidified inorganics</li> <li>• Salt waste</li> <li>• Solidified organics</li> </ul>	Physical waste form	Acceptable knowledge, radiography, and/or visual examination	<ul style="list-style-type: none"> <li>• Determine waste matrix</li> <li>• Demonstrate compliance with waste acceptance criteria (e.g., no liquid in excess of TSDF-WAC limits, no incompatible wastes, no compressed gases)</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Listed</li> <li>• Characteristic</li> </ul>	Statistical sampling <sup>a</sup> (see Tables C-3 and C-4)	<ul style="list-style-type: none"> <li>• Determine characteristic metals and organics</li> <li>• Resolve the assignment of EPA hazardous waste numbers</li> </ul>
S4000-Soil/Gravel	<ul style="list-style-type: none"> <li>• Contaminated soil/debris</li> </ul>	Physical waste form	Acceptable knowledge, radiography, and/or visual examination	<ul style="list-style-type: none"> <li>• Determine waste matrix</li> <li>• Demonstrate compliance with waste acceptance criteria (e.g., no liquid in excess of TSDF-WAC limits, no incompatible wastes, no compressed gases)</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Characteristic</li> <li>• Listed</li> </ul>	Statistical gas sampling and analysis <sup>a</sup> (see Table C-2)	<ul style="list-style-type: none"> <li>• Resolve the assignment of EPA hazardous waste numbers</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Characteristic</li> </ul>	Acceptable knowledge	<ul style="list-style-type: none"> <li>• Determine characteristic metals and organics</li> </ul>
S5000-Debris Waste	<ul style="list-style-type: none"> <li>• Uncategorized metal (metal waste other than lead/cadmium)</li> <li>• Lead/cadmium waste</li> <li>• Inorganic nonmetal waste</li> <li>• Combustible waste</li> <li>• Graphite waste</li> <li>• Heterogeneous debris waste</li> <li>• Composite filter waste</li> </ul>	Physical waste form	Acceptable knowledge, radiography, and/or visual examination	<ul style="list-style-type: none"> <li>• Determine waste matrix</li> <li>• Demonstrate compliance with waste acceptance criteria (e.g., no liquid in excess of TSDF-WAC limits, no incompatible wastes, no compressed gases)</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Characteristic</li> <li>• Listed</li> </ul>	Statistical gas sampling and analysis <sup>a</sup> (see Table C-2)	<ul style="list-style-type: none"> <li>• Resolve the assignment of EPA hazardous waste numbers</li> </ul>
		Hazardous constituents <ul style="list-style-type: none"> <li>• Characteristic</li> </ul>	Acceptable knowledge	<ul style="list-style-type: none"> <li>• Determine characteristic metals and organics</li> </ul>

<sup>a</sup> Applies to waste streams that require sampling.

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**Table C-6**  
**Required Program Records Maintained in Generator/Storage Site Project Files**

<p><u>Lifetime Records</u></p> <ul style="list-style-type: none"><li>• Field sampling data forms</li><li>• Field and laboratory chain-of-custody forms</li><li>• Test facility and laboratory batch data reports</li><li>• Waste Stream Characterization Package</li><li>• Sampling Plans</li><li>• Data reduction, validation, and reporting documentation</li><li>• Acceptable knowledge documentation</li><li>• Waste Stream Profile Form and Characterization Information Summary</li></ul>
<p><u>Non-Permanent Records</u></p> <ul style="list-style-type: none"><li>• Nonconformance documentation</li><li>• Variance documentation</li><li>• Assessment documentation</li><li>• Gas canister tags</li><li>• Methods performance documentation</li><li>• Performance Demonstration Program documentation</li><li>• Sampling equipment certifications</li><li>• Calculations and related software documentation</li><li>• Training/qualification documentation</li><li>• QAPjPs (generator/storage sites) documentation (all revisions)</li><li>• Calibration documentation</li><li>• Analytical raw data</li><li>• Procurement documentation</li><li>• QA procedures (all revisions)</li><li>• Technical implementing procedures (all revisions)</li><li>• Audio/video recording (radiography, visual, etc.)</li></ul>

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**Table C-7  
WIPP Waste Information System Data Fields<sup>a</sup>**

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

- <sup>a</sup> This is not a complete list of the WWIS data fields.
- <sup>b</sup> Some of the fields required for characterization are also required for certification and/or transportation.
- <sup>c</sup> Container ID is the main relational field in the WWIS Database.
- <sup>d</sup> This is a multiple occurring field for each analyte, nuclide, etc.
- <sup>e</sup> These are logical fields requiring only a yes/no.
- <sup>f</sup> 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.

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**Table C-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

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**Table C-9**  
**Listing of Permitted Hazardous Waste Numbers**

<b>EPA Hazardous Waste Numbers</b>			
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	U239*

\* Acceptance of U-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.

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## FIGURES

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WASTE STREAM PROFILE FORM

Waste Stream Profile Number: \_\_\_\_\_  
Generator Site Name: \_\_\_\_\_ Technical Contract: \_\_\_\_\_  
Generator Site EPA ID: \_\_\_\_\_ Technical Contact Phone Number: \_\_\_\_\_  
Date of audit report approval by NMED: \_\_\_\_\_  
Title, version number and date of documents used for WAP Certification: \_\_\_\_\_

Did your facility generate this waste? Yes No  
If no, provide the name and EPA ID of the original generator: \_\_\_\_\_

WIPP ID: \_\_\_\_\_ Summary Category Group: \_\_\_\_\_  
Waste Stream Name: \_\_\_\_\_  
Description from the WTWBIR: \_\_\_\_\_

Defense Waste: Yes No Check one: CH RH  
Number of SWBs \_\_\_\_\_ Number of Drums \_\_\_\_\_ Number of Canisters \_\_\_\_\_  
Batch Data Report numbers supporting this waste stream characterization: \_\_\_\_\_  
List applicable EPA Hazardous Waste Numbers <sup>(2)</sup> \_\_\_\_\_  
Applicable TRUCON Content Numbers: \_\_\_\_\_

**Acceptable Knowledge Information<sup>(1)</sup>**  
(For the following, enter supporting documentation used (i.e., references and dates))

Required Program Information

- Map of site: \_\_\_\_\_
- Facility mission description: \_\_\_\_\_
- Description of operations that generate waste: \_\_\_\_\_
- Waste identification/categorization schemes: \_\_\_\_\_
- Types and quantities of waste generated: \_\_\_\_\_
- Correlation of waste streams generated from the same building and process, as applicable: \_\_\_\_\_
- Waste certification procedures: \_\_\_\_\_

Required Waste Stream Information

- Area(s) and building(s) from which waste stream was generated: \_\_\_\_\_
- Waste stream volume and time period of generation: \_\_\_\_\_
- Waste generating process description for each building: \_\_\_\_\_
- Waste process flow diagrams: \_\_\_\_\_
- Material inputs or other information identifying chemical/radionuclide content and physical waste form: \_\_\_\_\_
- Waste material parameter estimates per unit of waste: \_\_\_\_\_
- Which Defense Activity generated the waste: (check one)
  - Weapons activities including defense inertial confinement fusion
  - Naval reactors development
  - Verification and control technology
  - Defense research and development
  - Defense nuclear waste and material by products management
  - Defense nuclear material production
  - Defense nuclear waste and materials security and safeguards and security investigations

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

WASTE STREAM PROFILE FORM

Supplemental Documentation

Process design documents: \_\_\_\_\_  
Standard operating procedures: \_\_\_\_\_  
Safety Analysis Reports: \_\_\_\_\_  
Waste packaging logs: \_\_\_\_\_  
Test plans/research project reports: \_\_\_\_\_  
Site data bases: \_\_\_\_\_  
Information from site personnel: \_\_\_\_\_  
Standard industry documents: \_\_\_\_\_  
Previous analytical data: \_\_\_\_\_  
Material safety data sheets: \_\_\_\_\_  
Sampling and analysis data from comparable/surrogate waste: \_\_\_\_\_  
Laboratory notebooks: \_\_\_\_\_

Confirmation Information<sup>(2)</sup>

[For the following, when applicable, enter procedure title(s), number(s), and date(s)]

Radiography: \_\_\_\_\_  
Visual Examination: \_\_\_\_\_

Waste Stream Profile Form Certification

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

\_\_\_\_\_  
Signature of Site Project Manager

\_\_\_\_\_  
Printed Name and Title

\_\_\_\_\_  
Date

NOTE:

- (1) Use back of sheet or continuation sheets, if required.
- (2) If, radiography, visual examination were used to confirm EPA Hazardous Waste Numbers, attach signed Characterization Information Summary documenting this determination.

**Figure C-1**  
**WIPP Waste Stream Profile Form (Example Only – Continued)**

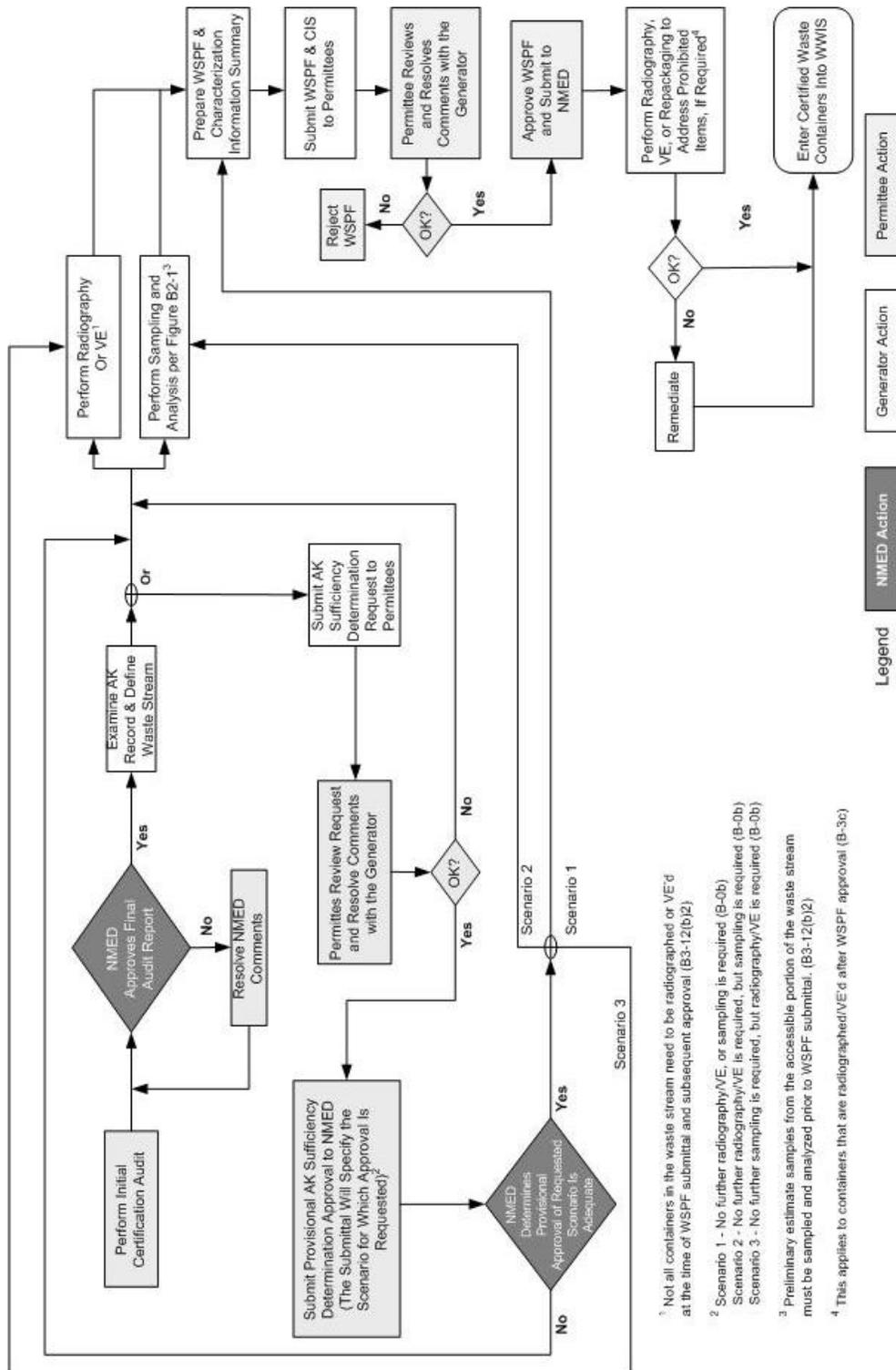
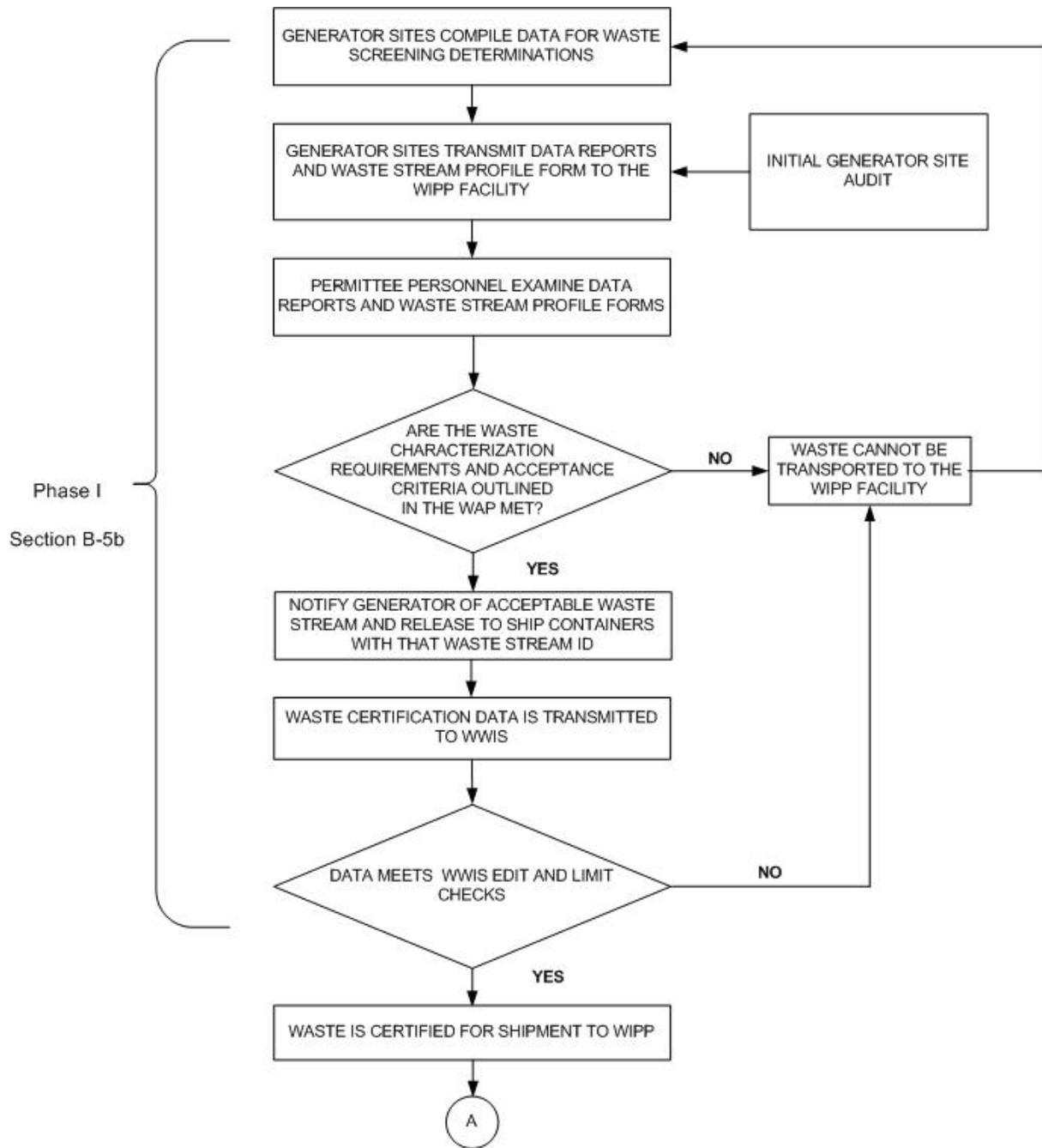
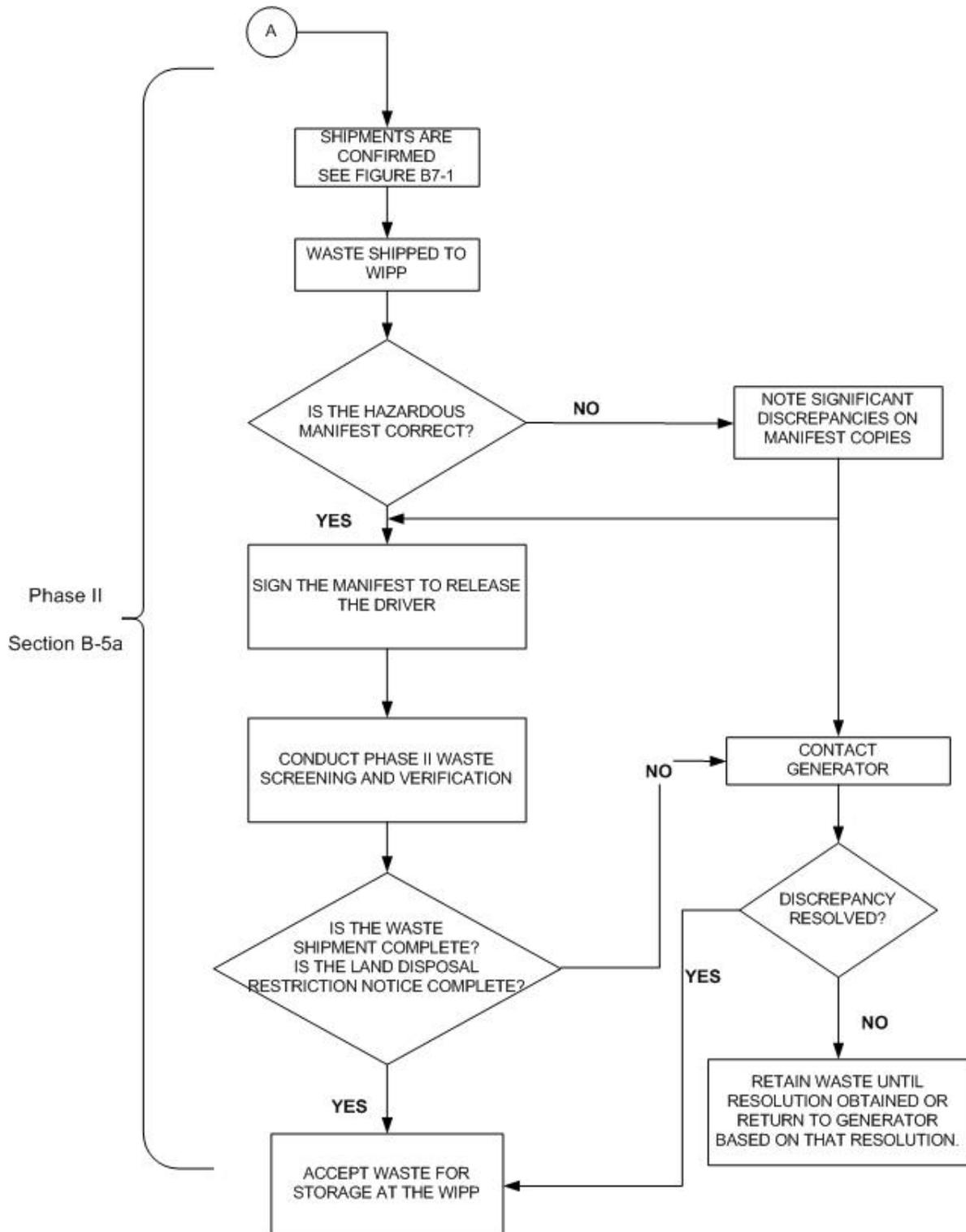


Figure C-2  
 Waste Characterization Process

¹ Not all containers in the waste stream need to be radiographed or VE'd at the time of WSPF submittal and subsequent approval (B3-12(b)2)  
 ² Scenario 1 - No further radiography/VE, or sampling is required (B-0b)  
 Scenario 2 - No further radiography/VE is required, but sampling is required (B-0b)  
 Scenario 3 - No further sampling is required, but radiography/VE is required (B-0b)  
 ³ Preliminary estimate samples from the accessible portion of the waste stream must be sampled and analyzed prior to WSPF submittal. (B3-12(b)2)  
 ⁴ This applies to containers that are radiographed/VE'd after WSPF approval (B-3c)



**Figure C-3**  
**TRU Mixed Waste Screening and Verification**



**Figure C-3**  
**TRU Mixed Waste Screening and Verification (Continued)**