

ATTACHMENT B4

**TRU MIXED WASTE CHARACTERIZATION USING
ACCEPTABLE KNOWLEDGE**

Waste Isolation Pilot Plant
Hazardous Waste Permit
April 1, 2010

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ATTACHMENT B4

TRU MIXED WASTE CHARACTERIZATION USING ACCEPTABLE KNOWLEDGE

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Figure B4-1	Compilation of Acceptable Knowledge Documentation
Figure B4-2	Acceptable Knowledge Auditing

1 applicable provisions of the acceptable knowledge process prior to management, storage, or
2 disposal by the Permittees at WIPP.

3 B4-2 Acceptable Knowledge Documentation

4 The Permittees shall obtain from each Department of Energy (**DOE**) TRU mixed waste
5 generator/storage site (**site**) a logical sequence of acceptable knowledge information that
6 progresses from general facility information (TRU Mixed Waste Management Program
7 Information) to more detailed waste-specific information (TRU Mixed Waste Stream
8 Information). Traceability of acceptable knowledge information for a selected container in the
9 audited Waste Summary Category Group(s) will be examined during the Permittees' audit of a
10 site (Section B4-3g). The consistent presentation of acceptable knowledge documentation
11 among sites in auditable records¹ will allow the Permittees to verify the completeness and
12 adequacy of acceptable knowledge for TRU mixed waste characterization during the audit
13 process. The Permittees shall implement the acceptable knowledge process as specified in this
14 Permit to characterize TRU mixed wastes and obtain sufficient waste characterization data to
15 demonstrate compliance with the Permit. The New Mexico Environment Department (**NMED**)
16 may independently validate the implementation of and compliance with applicable provisions of
17 the WAP at each generator/storage site by participation in the Permittees' Audit and
18 Surveillance Program (Permit Attachment B6). The Permittees shall provide NMED with current
19 audit schedules and notify NMED in writing no later than thirty (30) calendar days prior to each
20 audit. NMED may choose to accompany the Permittees on any audit of the WAP
21 implementation.

22 The following sections include the information the Permittees will require for each site to
23 characterize TRU mixed waste using acceptable knowledge. Because waste generating
24 processes are site-specific, sites shall, as necessary, augment the required acceptable
25 knowledge records with additional supporting information (see Section B4-2c, Supporting
26 Acceptable Knowledge Information). If the required information is not available for a particular
27 waste stream, the waste stream will not be eligible for an AK Sufficiency Determination as
28 specified in Section B4-3d.

29 B4-2a Required TRU Mixed Waste Management Program Information

30 TRU mixed waste management program information shall clearly define waste categorization
31 schemes and terminology, provide a breakdown of the types and quantities of TRU mixed waste
32 that are generated and stored at the site, and describe how waste is tracked and managed at
33 the site, including historical and current operations. Information related to TRU mixed waste
34 certification procedures and the types of documentation (e.g., waste profile forms) used to
35 summarize acceptable knowledge shall also be provided. The following information shall be
36 included as part of the acceptable knowledge written record:

- 37
- Map of the site with the areas and facilities involved in TRU mixed waste generation,
38 treatment, and storage identified

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

- 1 • Facility mission description as related to TRU mixed waste generation and
2 management (e.g., nuclear weapons research may involve metallurgy, radiochemistry,
3 and nuclear physics operations that result in specific waste streams)
- 4 • Description of the operations that generate TRU mixed waste at the site (e.g.,
5 plutonium recovery, weapons design, or weapons fabrication)
- 6 • Waste identification or categorization schemes used at the facility (e.g., item
7 description codes, content codes)
- 8 • Types and quantities of TRU mixed waste generated, including historical generation
9 through future projections
- 10 • Correlation of waste streams generated from the same building and process, as
11 appropriate (e.g., sludge, combustibles, metals, and glass)
- 12 • Waste certification procedures for retrievably stored and newly generated wastes to be
13 sent to the WIPP facility

14 B4-2b Required TRU Mixed Waste Stream Information

15 The Permittees may use acceptable knowledge to delineate site-specific waste streams. For
16 each TRU mixed waste stream, the Permittees shall require sites to compile all process
17 information and data that support the acceptable knowledge used to characterize that waste
18 stream. The type and quantity of supporting documentation will vary by waste stream,
19 depending on the process generating the waste and site-specific requirements imposed by the
20 Permittees. At a minimum, the waste process information shall include the following written
21 information:

- 22 • Area(s) and/or building(s) from which the waste stream was or is generated
- 23 • Waste stream volume and time period of generation (e.g., 100 standard waste boxes
24 of retrievable stored waste generated from June 1977 through December 1977)
- 25 • Waste generating process described for each building (e.g., batch waste stream
26 generated during decommissioning operations of glove boxes), including processes
27 associated with U134 waste generation, if applicable.
- 28 • Process flow diagrams (e.g., a diagram illustrating glove boxes from a specific building
29 to a size reduction facility to a container storage area). In the case of
30 research/development, analytical laboratory waste, or other similar processes where
31 process flow diagrams cannot be created, a description of the waste generating
32 processes, rather than a formal process flow diagram, may be included if this
33 modification is justified and the justification is placed in the auditable record
- 34 • Material inputs or other information that identifies the chemical content of the waste
35 stream and the physical waste form (e.g., glove box materials and chemicals handled
36 during glove box operations; events or processes that may have modified the chemical
37 or physical properties of the waste stream after generation; data obtained through

1 visual examination of newly generated waste that later undergoes radiography;
2 information demonstrating neutralization of U134 [hydrofluoric acid] and waste
3 compatibility)

4 The acceptable knowledge written record shall include a summary that identifies all sources of
5 waste characterization information used to delineate the waste stream. The basis and rationale
6 for delineating each waste stream, based on the parameters of interest, shall be clearly
7 summarized and traceable to referenced documents. Assumptions made in delineating each
8 waste stream also shall be identified and justified. If discrepancies exist between required
9 information, then sites shall apply all hazardous waste numbers indicated by the information to
10 the subject waste stream unless the sites choose to justify an alternative assignment and
11 document the justification in the auditable record. The Permittees shall obtain from each site, at
12 a minimum, procedures that comply with the following acceptable knowledge requirements:

- 13 • Procedures for identifying and assigning the physical waste form of the waste
- 14 • Procedures for delineating waste streams and assigning Waste Matrix Codes
- 15 • Procedures for resolving inconsistencies in acceptable knowledge documentation
- 16 • Procedures for headspace gas sampling and analysis, visual examination and/or
17 radiography, and homogeneous waste sampling and analysis, if applicable
- 18 • For newly generated waste, procedures describing process controls used to ensure
19 prohibited items (specified in the WAP, Permit Attachment B) are documented and
20 managed
- 21 • Procedures to ensure radiography and visual examination include a list of prohibited
22 items that the operator shall verify are not present in each container (e.g., liquid
23 exceeding TSDF-WAC limits, corrosives, ignitables, reactives, and incompatible
24 wastes)
- 25 • Procedures to document how changes to Waste Matrix Codes, waste stream
26 assignment, and associated Environmental Protection Agency (**EPA**) hazardous waste
27 numbers based on material composition are documented for any waste
- 28 • Procedures for assigning EPA hazardous waste numbers to TRU mixed waste
29 streams
- 30 • Procedures for estimating waste material parameter weights

31 B4-2c Supporting Acceptable Knowledge Information

32 The generator/storage sites shall obtain supporting acceptable knowledge information. The
33 amount and type of supporting information is site-specific and cannot be mandated, but sites
34 shall collect information as appropriate to augment required information. Adequacy of
35 supporting information shall be assessed by the Permittees during audits (Section B4-3g). Sites
36 will use this information to compile the acceptable knowledge written record. Supporting

1 acceptable knowledge documentation that may be used (if available) in addition to the required
2 information specified above include, but are not limited to, the following information:

- 3 • Process design documents (e.g., Title II Design)
- 4 • Standard operating procedures that may include a list of raw materials or reagents, a
5 description of the process or experiment generating the waste, and a description of
6 wastes generated and how the wastes are managed at the point of generation
- 7 • Preliminary and final safety analysis reports and technical safety requirements
- 8 • Waste packaging logs
- 9 • Test plans or research project reports that describe reagents and other raw materials
10 used in experiments
- 11 • Site databases (e.g., chemical inventory database for Superfund Amendments and
12 Reauthorization Act Title III requirements)
- 13 • Information from site personnel (e.g., documented interviews)
- 14 • Standard industry documents (e.g., vendor information)
- 15 • Analytical data relevant to the waste stream, including results from fingerprint
16 analyses, spot checks, or routine verification sampling. This may also include new
17 information which augments required information (e.g., visual examination not
18 performed in compliance with the WAP)
- 19 • Material Safety Data Sheets, product labels, or other product package information
- 20 • Sampling and analysis data from comparable or surrogate waste streams (e.g.,
21 equivalent nonradioactive materials)
- 22 • Laboratory notebooks that detail the research processes and raw materials used in an
23 experiment

24 For waste containers that belong to LANL sealed sources waste streams, these containers do
25 not require headspace gas sampling and analysis if the following information is part of the AK
26 documentation:

- 27 • Documentation that the waste container contents meet the definition of sealed sources
28 per 10 CFR §30.4 and 10 CFR §835.2 (effective January 1, 2004).
- 29 • Documentation of the certification of the sealed sources as U.S. Department of
30 Transportation Special Form Class 7 (Radioactive) Material per 49 CFR §173.403
31 (effective October 1, 2003).
- 32 • Documentation of contamination survey results that validate the integrity of each
33 sealed source per 10 CFR §34.27 (effective January 1, 2004).

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

- 3 • The outer casing of each sealed source must be of a non-VOC bearing material, which
4 must be verified at the time of packaging.

- 5 • AK Documentation shall also include but shall not be limited to, as available and as
6 necessary to determine the hazardous constituents associated with sealed sources,
7 the following: source manufacturer's sales catalogues, original purchase records,
8 source manufacturer's fabrication documents, source manufacturer's drawings, source
9 manufacturer's fuel capture assembly reports, source manufacturer's operational
10 procedures for cleanliness requirements, source manufacturer's shipping documents,
11 source manufacturer's welding records, transuranic batch material records, and
12 information from national databases (e.g., NMMSS). All of this information may not and
13 need not be available for each source, but sufficient information must be included in
14 the auditable record to derive an adequate understanding of source construction and
15 history to ensure that no VOCs are present in association with the sealed source itself
16 that would render the source hazardous. If AK data indicate that assignment of a
17 hazardous waste number related to organic materials is required in association with a
18 source, this specific source will be assigned to a separate waste stream and that
19 waste stream will be subject to representative headspace gas sampling unless a
20 separate AK Sufficiency Determination is approved by the Permittees for the waste
21 stream.

22 All specific, relevant supporting acceptable knowledge documentation assembled and used in
23 the acceptable knowledge process, whether it supports or contradicts any required acceptable
24 knowledge documentation, shall be identified and an explanation provided for its use
25 (e.g., identification of a toxicity characteristic). Supporting documentation may be used to further
26 document the rationale for the hazardous characterization results. The collection and use of
27 supporting information shall be assessed by the Permittees during site audits to ensure that
28 hazardous waste characterization is supported, as necessary, by supporting information. Similar
29 to required information, if discrepancies exist between supporting information and the required
30 information, then sites shall apply all hazardous waste numbers indicated by the supporting
31 information to the subject waste stream unless the sites choose to justify an alternative
32 assignment and document the justification in the auditable record.

33 B4-3 Acceptable Knowledge Training, Procedures and Other Requirements

34 The Permittees shall require consistency among sites in using acceptable knowledge
35 information to characterize TRU mixed waste by the use of the following: 1) compiling the
36 required and supporting acceptable knowledge documentation in an auditable record, 2)
37 auditing acceptable knowledge records, and 3) WSPF approval and waste confirmation. This
38 section specifies qualification and training requirements, describes each phase of the process,
39 specifies the procedures that the Permittees shall require all sites to develop to implement the
40 requirements for using acceptable knowledge, and specifies data quality requirements for
41 acceptable knowledge.

1 B4-3a Qualifications and Training Requirements

2 Site personnel responsible for compiling acceptable knowledge, assessing acceptable
3 knowledge, and resolving discrepancies associated with acceptable knowledge shall be
4 qualified and trained in the following areas at a minimum:

- 5 • WIPP WAP in Permit Attachment B and the TSDf-WAC specified in this permit
- 6 • State and Federal RCRA regulations associated with solid and hazardous waste
7 characterization
- 8 • Discrepancy resolution and reporting processes
- 9 • Site-specific procedures associated with waste characterization using acceptable
10 knowledge

11 B4-3b Acceptable Knowledge Assembly and Compilation

12 The Permittees shall obtain from sites acceptable knowledge procedures which require
13 consistent application of the acceptable knowledge process and requirements. Site-specific
14 acceptable knowledge procedures shall address the following:

- 15 • Sites shall prepare and implement a written procedure outlining the specific
16 methodology used to assemble acceptable knowledge records, including the origin of
17 the documentation, how it will be used, and any limitations associated with the
18 information (e.g., identify the purpose and scope of a study that included limited
19 sampling and analysis data).
- 20 • Sites shall develop and implement a written procedure to compile the required
21 acceptable knowledge record.
- 22 • Sites shall develop and implement a written procedure that ensures unacceptable
23 wastes (e.g., reactive, ignitable, corrosive) are identified and segregated from TRU
24 mixed waste populations sent to WIPP.
- 25 • Sites shall prepare and implement a written procedure to evaluate acceptable
26 knowledge and resolve discrepancies. If different sources of information indicate
27 different hazardous wastes are present, then sites shall include all sources of
28 information in its records and conservatively assign all potential hazardous waste
29 numbers unless the sites choose to justify an alternative assignment and document
30 the justification in the auditable record. The assignment of hazardous waste numbers
31 shall be tracked in the auditable record to all required documentation.

- 1 • Sites shall prepare and implement a written procedure to identify hazardous wastes
2 and assign the appropriate hazardous waste numbers to each waste stream. The
3 following are minimum baseline requirements/standards that site-specific procedures
4 shall include to ensure comparable and consistent characterization of hazardous
5 waste:
- 6 – Compile all of the required information in an auditable record.
- 7 – Review the compiled information and delineate TRU mixed waste streams.
8 Delineation of waste streams must comply with the following definition: a waste
9 stream is defined as waste material generated from a single process or from an
10 activity that is similar in material, physical form, and hazardous constituents.
- 11 – Review the compiled information to determine if the waste stream is compliant with
12 the TSDF-WAC.
- 13 – Review the required information to determine if the waste is listed under 20.4.1.200
14 NMAC (incorporating 40 CFR §261), Subpart D. Assign all listed hazardous waste
15 numbers unless the sites choose to justify an alternative assignment and
16 document the justification in the auditable record.
- 17 – Review the required information to determine if the waste exhibits a hazardous
18 characteristic or may contain hazardous constituents included in the toxicity
19 characteristics specified in 20.4.1.200 NMAC (incorporating 40 CFR §261),
20 Subpart C. If a toxicity characteristic contaminant is identified and is not included
21 as a listed waste, assign the toxicity characteristic number unless data are
22 available that demonstrate that the concentration of the constituent in the waste is
23 less than the toxicity characteristic regulatory level. When data are not available,
24 the toxicity characteristic hazardous waste number for the identified hazardous
25 constituent shall be applied to the mixed waste stream.
- 26 – Review the compiled information to provide an estimate of material parameter
27 weights for each container to be stored or disposed of at WIPP.
- 28 For newly generated wastes, procedures shall be developed and implemented to
29 characterize hazardous waste using acceptable knowledge prior to packaging the
30 waste.
- 31 • Sites shall ensure that results of audits of the TRU mixed waste characterization
32 programs at the site are available in the records.
- 33 • Sites shall identify all process controls (implemented to ensure that the waste contains
34 no prohibited items and to control hazardous waste content and/or physical form) that
35 may have been applied to retrievably stored waste and/or may presently be applied to
36 newly generated waste. Process controls are applied at the time of waste
37 generation/packaging to control waste content, whereas any activities performed after
38 waste generation/packaging to identify prohibited items, hazardous waste content, or
39 physical form are waste characterization activities, not process controls. The AK
40 record must contain specific process controls and supporting documentation

1 identifying when these process controls are used to control waste content. See Permit
2 Attachment B, Section B-2 for programmatic requirements related to process controls.

3 B4-3c Criteria for Assembling an Acceptable Knowledge Record and Delineating the Waste
4 Stream

5 Figure B4-1 provides an overview of the process for assembling acceptable knowledge
6 documentation into an auditable record. The first step is to assemble all of the required
7 acceptable knowledge information and any supporting information regarding the materials and
8 processes that generate a specific waste stream. The Permittees shall require the sites to
9 implement procedures which comply with the following criteria to establish acceptable
10 knowledge records:

- 11 • Acceptable knowledge information shall be compiled in an auditable record, including
12 a road map for all applicable information.
- 13 • The overview of the facility and TRU mixed waste management operations in the
14 context of the facility's mission shall be correlated to specific waste stream information.
- 15 • Correlations between waste streams, with regard to time of generation, waste
16 generating processes, and site-specific facilities shall be clearly described. For newly
17 generated wastes, the rate and quantity of waste to be generated shall be defined.
- 18 • A reference list shall be provided that identifies documents, databases, Quality
19 Assurance protocols, and other sources of information that support the acceptable
20 knowledge information.

21 Container inventories for TRU mixed waste currently in retrievable storage shall be delineated
22 into waste streams by correlating the container identification to all of the required acceptable
23 knowledge information and any supporting acceptable knowledge information.

24 B4-3d AK Sufficiency Determination Request Contents

25 Generator/storage sites may submit an AK Sufficiency Determination Request (**Determination**
26 **Request**) to meet all or part of the waste characterization requirements. The Determination
27 Request shall include, at a minimum:

- 28 • Identification of the scenario for which the approval is sought (Permit Attachment B,
29 Section B-0b).
- 30 • A complete AK Summary that addresses the following technical requirements:
 - 31 – Executive Summary;
 - 32 – Waste Stream Identification Summary, including a demonstration that the waste
33 stream has been properly delineated and meets the Permit definition of waste
34 stream (Permit Attachment B, Introduction);
 - 35 – Mandatory Program Information (including, but not limited to, facility location and
36 description, mission, defense waste assessment, spent nuclear fuel and high-level

- 1 waste assessment, description of waste generating processes,
2 research/development [as necessary], facility support operations [as applicable],
3 types and quantities of TRU waste generated, correlation of waste streams to
4 buildings/processes, waste identification and categorization, physical form
5 identifiers);
- 6 – Mandatory Waste Stream Information (including, but not limited to, Area and
7 Building of Generation, waste stream volume/period of generation (including, for
8 newly generated waste, the rate and quantity of waste to be generated), waste
9 generating activities, types of waste generated, material input related to physical
10 form and identification of percentage of each waste material parameter in the
11 waste stream, chemical content information including hazardous constituents and
12 hazardous waste identification, prohibited item content (including documented
13 evidence that the waste meets the TSDF-WAC Permit Conditions II.C.3.a-h),
14 waste packaging, presence of filter vents, number of layers of confinement);
- 15 – Types of supporting information gathered;
- 16 – Container specific data (if available and relevant); and
- 17 – A complete reference list including all mandatory and supporting information.
- 18 • An AK roadmap (defined as a cross reference between mandatory programmatic and
19 mandatory waste stream information, with references supporting these requirements).
- 20 • A complete reference list including all mandatory and supporting documentation.
- 21 • Relevant supporting information for the required programmatic and waste stream data
22 addressed in the AK Summary, examples of which are presented in Permit Attachment
23 B4, Section B4-2c.
- 24 • Identification of any mandatory requirements supported only by upper tier documents
25 (i.e., there is insufficient supporting data).
- 26 • Description or other means of demonstrating that the AK process described in the
27 Permit was followed (for example, AK personnel were appropriately trained;
28 discrepancies were documented, etc).
- 29 • Information showing that the generator/storage site has developed a written procedure
30 for compiling the AK information and assigning hazardous waste numbers as required
31 in Permit Attachment B4-3b.
- 32 • Information showing that the generator/storage site has assessed the AK process
33 (e.g. internal audits, Permit Attachment B4-3b).
- 34 The Permittees shall evaluate the Determination Request for completeness and technical
35 adequacy as specified in Permit Attachment B.

1 B4-3e Requirements for Re-evaluating Acceptable Knowledge Information

2 Acceptable knowledge includes information regarding the physical form of the waste, the base
3 materials composing the waste, and the process that generates the waste. Waste sampling and
4 analysis (i.e., radiography or visual examination, headspace-gas sampling and analysis, and
5 homogeneous waste sampling and analysis) may be used to augment acceptable knowledge
6 information.

7 The Waste Stream Profile Form (**WSPF**) and Characterization Information Summary (including
8 the acceptable knowledge summary) will be reviewed for each waste stream prior to Permittee
9 approval of the WSPF. The Permittees review will ensure that the submitted AK information was
10 collected under procedures that ensure implementation of the WAP, provides data sufficient to
11 meet the DQOs in Section B-4a(1), and allow the Permittees to demonstrate compliance with
12 the waste analysis requirements of the Permit. A detailed discussion of the Permittees' waste
13 stream review and approval process is provided in Section B -1d.

14 The Permittees shall require sites to establish procedures for reevaluating acceptable
15 knowledge if the results of waste confirmation indicate that the waste to be shipped does not
16 match the approved waste stream, or if data obtained from radiography or visual examination
17 for waste streams without an AK Sufficiency Determination exhibit this discrepancy. Site
18 procedures shall describe how the waste is reassigned, acceptable knowledge reevaluated, and
19 appropriate hazardous waste numbers assigned. If the reevaluation requires that the Waste
20 Matrix Code be changed for the waste stream or the waste does not match the approved waste
21 stream, the following minimum steps shall be taken to reevaluate acceptable knowledge:

- 22 • Review existing information based on the container identification number and
23 document all differences in hazardous waste number assignments
- 24 • If differences exist in the hazardous waste numbers that were assigned, reassess and
25 document all required acceptable knowledge information (Section B4-3b) associated
26 with the new designation
- 27 • Reassess and document all sampling and analytical data associated with the waste
- 28 • Verify and document that the reassigned Waste Matrix Code was generated within the
29 specified time period, area and buildings, waste generating process, and that the
30 process material inputs are consistent with the waste material parameters identified
31 during radiography or visual examination
- 32 • Record all changes to acceptable knowledge records
- 33 • If discrepancies exist in the acceptable knowledge information for the revised Waste
34 Matrix Code, document the segregation of the affected portion of the waste stream,
35 and define the actions necessary to fully characterize the waste

36 Potential toxicity characteristics for base materials that compose TRU mixed heterogeneous
37 debris (S5000) waste may be determined without destructive sampling and analysis via
38 acceptable knowledge. Sites will assign a Waste Matrix Code and waste stream to each
39 container of waste using acceptable knowledge. In lieu of sampling and analytical or other data
40 to the contrary (including headspace gas and total/TCLP analysis of solids/soils), sites shall

1 assign the toxicity characteristic hazardous waste numbers based on the presence of the
2 constituent identified by acceptable knowledge, regardless of the quantity or concentration.
3 Procedures shall describe how additions to hazardous waste numbers based on material
4 composition are documented, as necessary (Section B4-3b).

5 The Permittees shall require sites to use acceptable knowledge to identify spent solvents
6 associated with each TRU mixed waste stream or waste stream lot. Headspace-gas data will be
7 used to resolve the assignment of EPA F-listed hazardous waste numbers to debris waste
8 streams when waste streams do not have an AK Sufficiency Determination approved by the
9 Permittees. In this case, sites shall assign F-listed hazardous waste numbers (20.4.1.200
10 NMAC, incorporating 40 CFR §261.31) by evaluating the average concentrations of each VOC
11 detected in container headspace gas for each waste stream or waste stream lot using the upper
12 90 percent confidence limit (**UCL₉₀**). The UCL₉₀ for the mean concentration shall be compared
13 to the program required quantitation limit (**PRQL**) for the constituent. If the UCL₉₀ for the mean
14 concentration exceeds the PRQL, sites shall reevaluate their acceptable knowledge information
15 and determine the potential source of the constituent. Sites shall provide documentation to
16 support any determination that F-listed organic constituents are associated with packaging
17 materials, radiolysis, or other uses not consistent with solvent use. If the source of the detected
18 F-listed solvents can not be identified, the appropriate spent solvent hazardous waste number
19 will be conservatively applied to the waste stream. In the case of applicable toxicity
20 characteristic VOCs and non-toxic F003 constituents, generator/storage sites may assess
21 whether the head space gas concentration would render the waste non-hazardous for those
22 characteristics and change the initial acceptable knowledge determination accordingly.

23 EPA hazardous waste numbers associated with S3000 and S4000 waste streams will be
24 assigned based on the results of the total/TCLP analysis of a representative homogeneous
25 waste sample when waste streams do not have an AK Sufficiency Determination approved by
26 the Permittees. As with headspace gas, if the total/TCLP results indicate that the concentration
27 of a characteristic waste or non-toxic constituent of an F003 waste is below regulatory levels,
28 the hazardous waste number assigned initially by acceptable knowledge may be changed.
29 Otherwise, if an F-listed waste constituent is detected, the appropriate hazardous waste number
30 shall be applied.

31 If the site determines that the source of the F-listed constituent is a spent solvent used in the
32 process or is determined to be the result of mixing a listed waste with a solid waste during waste
33 packaging, or applicable toxicity characteristic or non-toxic F003 wastes are present in excess
34 of regulatory levels, then the site will either: 1) assign the applicable listed hazardous waste
35 number to the entire waste stream, or 2) segregate the drums containing detectable
36 concentrations of the solvent into a separate waste stream and assign applicable hazardous
37 waste numbers. Each site shall document, justify, and consistently delineate waste streams and
38 assign hazardous waste numbers based on site-specific permit requirements and other state-
39 enforced agreements.

40 To determine the mean concentration of solvent VOCs, all headspace-gas data or
41 homogeneous waste data for a waste stream or waste stream lot (i.e., the portion of the waste
42 stream that is characterized as a unit) will be used, including data qualified with a 'J' flag (i.e.,
43 less than the PRQL but greater than the method detection limit [**MDL**]) or qualified with a 'U' flag
44 (i.e., undetected). For data qualified with a 'U' flag, sites shall use one-half the MDL in
45 calculating the mean concentration. Because listed wastes are not defined based on
46 concentration, sites may not remove hazardous waste numbers assigned using acceptable

1 knowledge if hazardous constituents are not detected in the headspace gas or solids/soil
2 analysis.

3 TRU mixed headspace gases and homogeneous waste matrices may contain one or two
4 constituents (e.g., carbon tetrachloride and 1,1,1-trichloroethane) at concentrations that are
5 orders of magnitude higher than the other target analytes. In these cases, samples shall be
6 diluted to remain within the instrument calibration range for the elevated constituents. Sample
7 dilution results in elevated MDLs for the constituents with elevated concentrations. Only the
8 concentrations of detected constituents will be used to calculate the mean for the purpose of
9 assigning F-listed hazardous waste numbers. Because the presence or absence of F-listed
10 solvents can not be assigned based on the artificially high MDLs that are caused by sample
11 dilution, data flagged as 'U' and showing an elevated MDL will not be used in calculating the
12 mean concentration.

13 B4-3f Acceptable Knowledge Data Quality Requirements

14 The data quality objectives for sampling and analysis techniques are provided in Permit
15 Attachment B3. Analytical results will be used to augment the characterization of wastes based
16 on acceptable knowledge. To ensure that the acceptable knowledge process is consistently
17 applied, the Permittees shall require sites to comply with the data quality requirements for
18 acceptable knowledge documentation in Permit Attachment B3.

19 Each site shall address quality control by tracking its performance with regard to the use of
20 acceptable knowledge by: 1) assessing the frequency of inconsistencies among information,
21 and 2) documenting the results of waste discrepancies identified by the generator/storage site
22 during waste characterization or the Permittees during waste confirmation using radiography,
23 review of radiography audio/video recordings, visual examination, or review of visual
24 examination records. In addition, the acceptable knowledge process and waste stream
25 documentation shall be evaluated through internal assessments by generator/storage site
26 quality assurance organizations.

27 B4-3g Audits of Acceptable Knowledge

28 The Permittees will conduct an initial audit of each site prior to certifying the site for shipment of
29 TRU mixed waste to the WIPP facility. This initial audit will establish an approved baseline that
30 will be reassessed annually by the Permittees. These audits will verify compliance with the
31 requirements specified in the WAP (Permit Attachment B). The audits will be used to verify
32 compliance with the compilation, application, and interpretation requirements of acceptable
33 knowledge information specified in this Permit at all sites, and to evaluate the completeness and
34 defensibility of site-specific acceptable knowledge documentation related to hazardous waste
35 characterization. Permit Attachment B6 gives a description of the overall audit program and a
36 required checklist. Figure B4-2 includes the primary steps associated with the audit process of
37 acceptable knowledge.

38 Site-specific audit plans will be prepared by the Permittees and provided to NMED, and will
39 identify the scope of the audit, requirements to be assessed, participating personnel, activities to
40 be audited, organizations to be notified, applicable documents, and schedule. Audits will be
41 performed in accordance with written procedures and site-specific checklists that will be
42 developed by the Permittees prior to the audit and provided to NMED. The site-specific audit
43 checklists will include items associated with the compilation and evaluation of the required

1 acceptable knowledge information as specified in the checklist required by Permit
2 Attachment B6.

3 Audit checklists shall include Table B6-3 in Permit Attachment B6, and will include but not be
4 limited to the following elements for review during the audit:

- 5 • Documentation of the process used to compile, evaluate, and record acceptable
6 knowledge is available and implemented;
- 7 • Personnel qualifications and training are documented;
- 8 • All of the required acceptable knowledge documentation specified in Section B4-2 has
9 been compiled in an auditable record;
- 10 • All of the required procedures specified in B4-3 have been developed and
11 implemented, including but not limited to:
 - 12 – A procedure exists for assigning hazardous waste numbers to waste streams in
13 accordance with Section B4-3;
 - 14 – A procedure exists for resolving discrepancies in acceptable knowledge
15 documentation in accordance with Section B4-3; and
- 16 • Results of other audits of the TRU mixed waste characterization programs at the site
17 are available in site records.

18 Members of the audit team will be knowledgeable regarding the required acceptable knowledge
19 information, RCRA regulations and EPA guidance regarding the use of acceptable knowledge
20 for waste characterization, RCRA hazardous waste characterization, and the WAP requirements
21 (Permit Attachment B). Audit team members will be independent of all TRU mixed waste
22 management operations at the site being audited.

23 Auditors will evaluate acceptable knowledge documentation for at least one waste stream from
24 the Summary Category Group(s) being audited, and will audit acceptable knowledge traceability
25 for at least one container from the audited Summary Category Group(s). For these waste
26 streams, auditors will review all procedures and associated processes developed by the site for
27 documenting the process of compiling acceptable knowledge documentation; correlating
28 information to specific waste inventories; assigning hazardous waste numbers; and identifying,
29 resolving, and documenting discrepancies in acceptable knowledge records. The adequacy of
30 acceptable knowledge procedures and processes will be assessed and any deficiencies in
31 procedures documented in the audit report.

32 Auditors will review the acceptable knowledge documentation for selected waste streams for
33 logic, completeness, and defensibility. The criteria that will be used by auditors to evaluate the
34 logic and defensibility of the acceptable knowledge documentation include completeness and
35 traceability of the information, consistency of application of information, clarity of presentation,
36 degree of compliance with this Permit Attachment with regard to acceptable knowledge data,
37 nonconformance procedures, and oversight procedures. Auditors will evaluate compliance with
38 written site procedures for developing the acceptable knowledge record. A completeness review
39 will evaluate the availability of all required TRU mixed waste management program information

1 and TRU mixed waste stream information (Section B4-2). Records will be reviewed for
2 correlation to specific waste streams and the basis for characterizing hazardous waste. Auditors
3 will verify that sites include all required information and conservatively include all potential
4 hazardous waste numbers indicated by the acceptable knowledge records. All deficiencies in
5 the acceptable knowledge documentation will be included in the audit report.

6 Auditors will verify and document that sites use administrative controls and follow written
7 procedures to characterize hazardous waste for newly-generated and retrievably stored wastes.
8 Procedures to document changes in acceptable knowledge documentation and changes to
9 hazardous waste number assignments to specific waste streams also will be evaluated for
10 compliance with the WAP (Permit Attachment B).

11 After the audit is complete, the Permittees will provide the site with preliminary results at a
12 close-out meeting. The Permittees will prepare a final audit report that includes all observations
13 and findings identified during the audit. Sites shall respond to all audit findings and identify
14 corrective actions. Audit results will be included in the final audit report (Permit Attachment B6).
15 If acceptable knowledge procedures do not exist, the required information is not available, or
16 corrective actions (i.e., CARs) are identified associated with acceptable knowledge compilation,
17 and/or hazardous waste characterization, the Permittees will not manage, store, or dispose TRU
18 mixed waste for the subject waste summary category. Management, storage, or disposal of the
19 subject waste summary category at WIPP will not resume until the Permittees find that all
20 corrective actions have been implemented and the site complies with all applicable
21 requirements of the WAP.

22 The National TRU Program disseminates information regarding TRU mixed waste
23 characterization requirements and program status through the WIPP Home Page. The
24 Permittees will use this web page to disseminate information regarding TRU mixed waste
25 streams, RCRA compliance, and operational and programmatic issues, methods development,
26 and waste characterization information, including the application of acceptable knowledge. The
27 Permittees are provided the required waste characterization information prior to management,
28 storage, or disposal of that waste at WIPP and also will conduct audits at least annually. The
29 Permittees will maintain an operating record for review during regulatory agency audits. NMED
30 may also review any information relevant to the scope of the audit during site audits. The
31 Permittees will notify NMED regarding any site's failure to implement corrective actions
32 associated with hazardous waste characterization as specified in Modules I and II and Permit
33 Attachment B3.

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FIGURES

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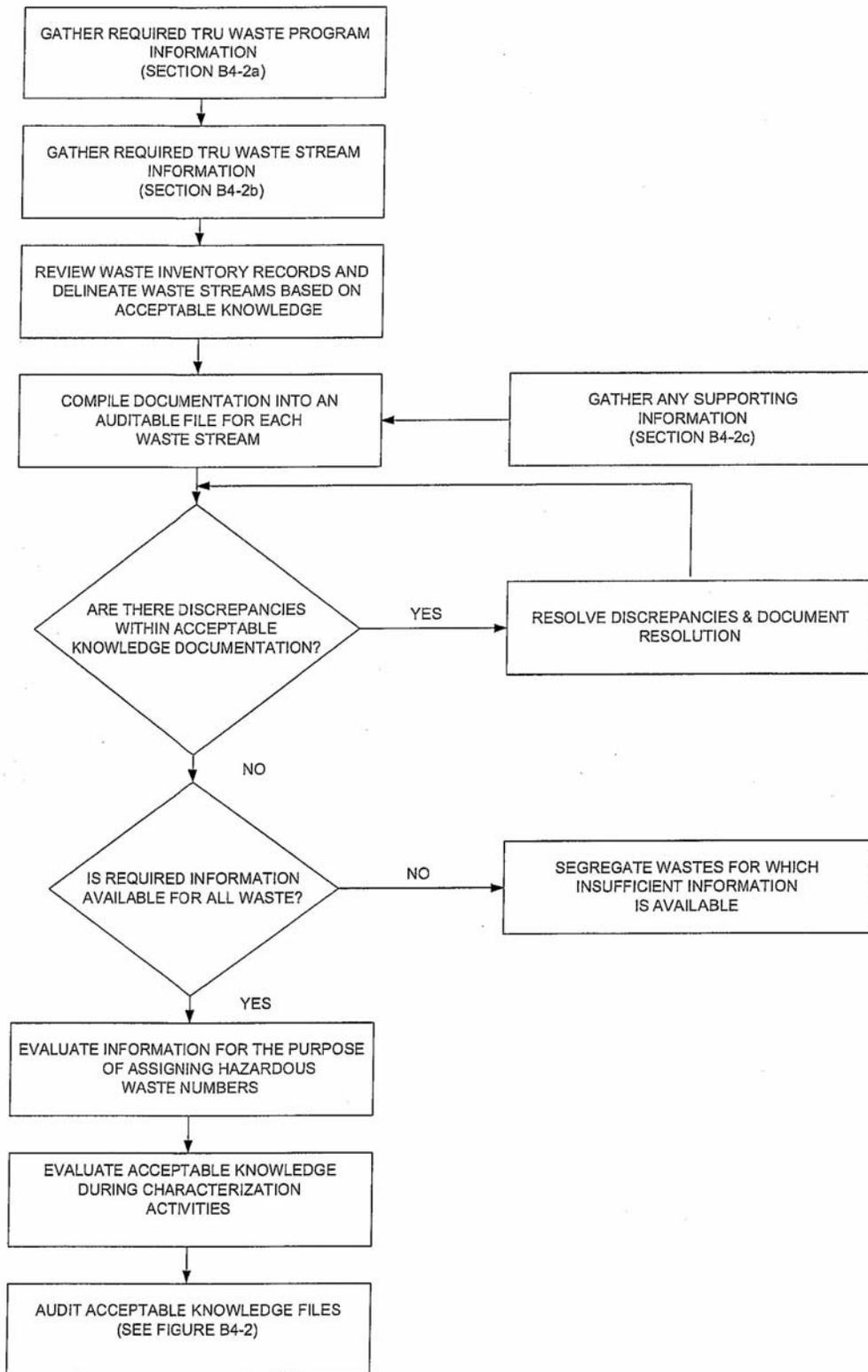


Figure B4-1
Compilation of Acceptable Knowledge Documentation

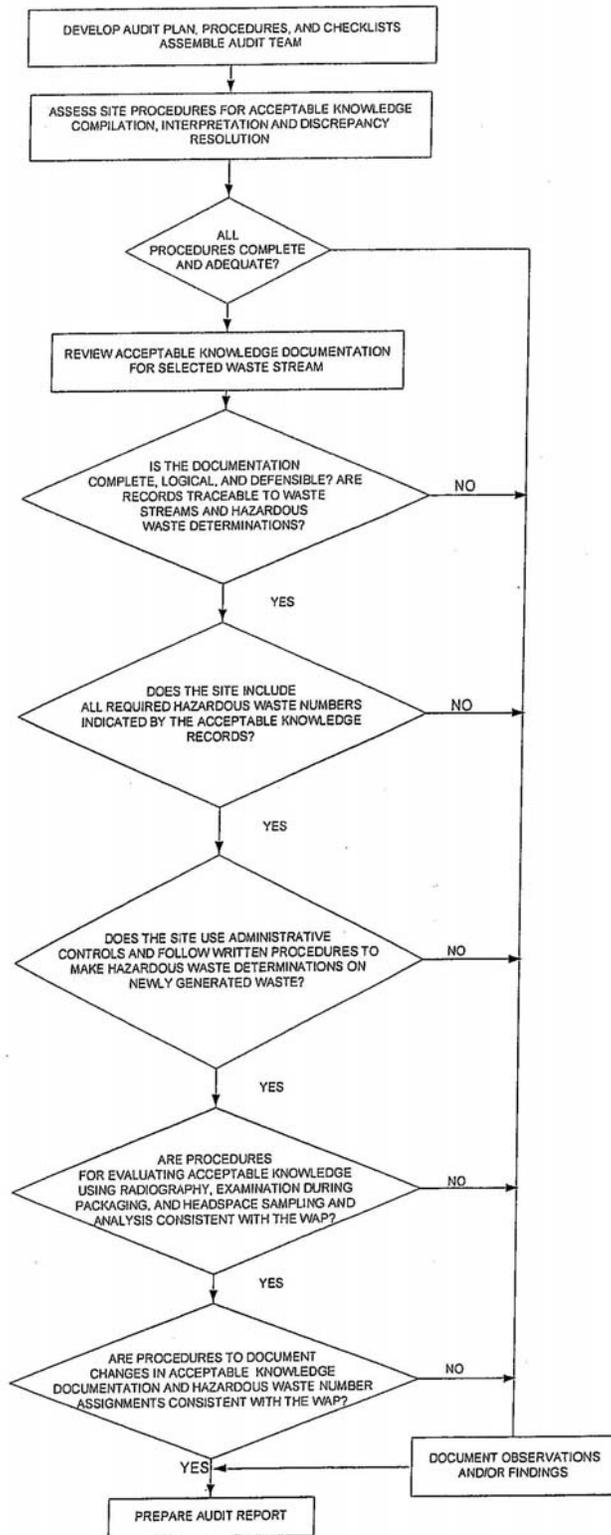


Figure B4-2
Acceptable Knowledge Auditing