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APPENDIX B4

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**TRU MIXED WASTE CHARACTERIZATION USING
ACCEPTABLE KNOWLEDGE**

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Acceptable Knowledge Auditing

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1 Sampling and analysis may be performed to augment the characterization of wastes based on
2 acceptable knowledge when an AK Sufficiency Determination has not been requested by the
3 generator/storage site or, if requested, has not been granted by the Permittees (see Section B4-
4 3d). Sampling and analysis consists of radiography, visual examination, headspace gas, and
5 homogeneous waste sampling and analysis. TRU mixed waste streams shall undergo applicable
6 provisions of the acceptable knowledge process prior to management, storage, or disposal by the
7 Permittees at WIPP.

8 B4-2 Acceptable Knowledge Documentation

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

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

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

33 TRU mixed waste management program information shall clearly define waste categorization
34 schemes and terminology, provide a breakdown of the types and quantities of TRU mixed waste
35 that are generated and stored at the site, and describe how waste is tracked and managed at the
36 site, including historical and current operations. Information related to TRU mixed waste

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 certification procedures and the types of documentation (e.g., waste profile forms) used to
2 summarize acceptable knowledge shall also be provided. The following information shall be
3 included as part of the acceptable knowledge written record:

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

19 B4-2b Required TRU Mixed Waste Stream Information

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

- 26 • Area(s) and/or building(s) from which the waste stream was or is generated
- 27 • Waste stream volume and time period of generation (e.g., 100 standard waste boxes of
28 retrievably stored waste generated from June 1977 through December 1977)
- 29 • Waste generating process described for each building (e.g., batch waste stream generated
30 during decommissioning operations of glove boxes), including processes associated with
31 U134 waste generation, if applicable.

- 1 • Process flow diagrams (e.g., a diagram illustrating glove boxes from a specific building
2 to a size reduction facility to a container storage area). In the case of
3 research/development, analytical laboratory waste, or other similar processes where
4 process flow diagrams cannot be created, a description of the waste generating processes,
5 rather than a formal process flow diagram, may be included if this modification is
6 justified and the justification is placed in the auditable record

- 7 • Material inputs or other information that identifies the chemical content of the waste
8 stream and the physical waste form (e.g., glove box materials and chemicals handled
9 during glove box operations; events or processes that may have modified the chemical or
10 physical properties of the waste stream after generation; data obtained through visual
11 examination of newly generated waste that later undergoes radiography; information
12 demonstrating neutralization of U134 [hydrofluoric acid] and waste compatibility)

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

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

- 1 • Procedures for assigning EPA hazardous waste numbers to TRU mixed waste streams
- 2 • Procedures for estimating waste material parameter weights

3 B4-2c Supporting Acceptable Knowledge Information

4 The generator/storage sites shall obtain supporting acceptable knowledge information. The
5 amount and type of supporting information is site-specific and cannot be mandated, but sites
6 shall collect information as appropriate to augment required information. Adequacy of
7 supporting information shall be assessed by the Permittees during audits (Section B4-3g). Sites
8 will use this information to compile the acceptable knowledge written record. Supporting
9 acceptable knowledge documentation that may be used (if available) in addition to the required
10 information specified above include, but are not limited to, the following information:

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

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

- 4 • Documentation that the waste container contents meet the definition of sealed sources per
5 10 CFR §30.4 and 10 CFR §835.2 (effective January 1, 2004).
- 6 • Documentation of the certification of the sealed sources as U.S. Department of
7 Transportation Special Form Class 7 (Radioactive) Material per 49 CFR §173.403
8 (effective October 1, 2003).
- 9 • Documentation of contamination survey results that validate the integrity of each sealed
10 source per 10 CFR §34.27 (effective January 1, 2004).
- 11 • AK documentation does not indicate the use of VOCs or VOC-bearing materials as
12 constituents of the sealed sources.
- 13 • The outer casing of each sealed source must be of a non-VOC bearing material, which
14 must be verified at the time of packaging.
- 15 • AK Documentation shall also include but shall not be limited to, as available and as
16 necessary to determine the hazardous constituents associated with sealed sources, the
17 following: source manufacturer's sales catalogues, original purchase records, source
18 manufacturer's fabrication documents, source manufacturer's drawings, source
19 manufacturer's fuel capture assembly reports, source manufacturer's operational
20 procedures for cleanliness requirements, source manufacturer's shipping documents,
21 source manufacturer's welding records, transuranic batch material records, and
22 information from national databases (e.g., NMMSS). All of this information may not and
23 need not be available for each source, but sufficient information must be included in the
24 auditable record to derive an adequate understanding of source construction and history
25 to ensure that no VOCs are present in association with the sealed source itself that would
26 render the source hazardous. If AK data indicate that assignment of a hazardous waste
27 number related to organic materials is required in association with a source, this specific
28 source will be assigned to a separate waste stream and that waste stream will be subject to
29 representative headspace gas sampling unless a separate AK Sufficiency Determination is
30 approved by the Permittees for the waste stream.

31 All specific, relevant supporting acceptable knowledge documentation assembled and used in the
32 acceptable knowledge process, whether it supports or contradicts any required acceptable
33 knowledge documentation, shall be identified and an explanation provided for its use
34 (e.g., identification of a toxicity characteristic). Supporting documentation may be used to further
35 document the rationale for the hazardous characterization results. The collection and use of
36 supporting information shall be assessed by the Permittees during site audits to ensure that
37 hazardous waste characterization is supported, as necessary, by supporting information. Similar
38 to required information, if discrepancies exist between supporting information and the required

1 information, then sites shall apply all hazardous waste numbers indicated by the supporting
2 information to the subject waste stream unless the sites choose to justify an alternative
3 assignment and document the justification in the auditable record.

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

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

12 B4-3a Qualifications and Training Requirements

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

- 16 • WIPP WAP in Permit Attachment B and the TSDF-WAC specified in this permit
- 17 • State and Federal RCRA regulations associated with solid and hazardous waste
18 characterization
- 19 • Discrepancy resolution and reporting processes
- 20 • Site-specific procedures associated with waste characterization using acceptable
21 knowledge

22 B4-3b Acceptable Knowledge Assembly and Compilation

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

- 26 • Sites shall prepare and implement a written procedure outlining the specific methodology
27 used to assemble acceptable knowledge records, including the origin of the
28 documentation, how it will be used, and any limitations associated with the information
29 (e.g., identify the purpose and scope of a study that included limited sampling and
30 analysis data).
- 31 • Sites shall develop and implement a written procedure to compile the required acceptable
32 knowledge record.

- 1 • Sites shall develop and implement a written procedure that ensures unacceptable wastes
2 (e.g., reactive, ignitable, corrosive) are identified and segregated from TRU mixed waste
3 populations sent to WIPP.
- 4 • Sites shall prepare and implement a written procedure to evaluate acceptable knowledge
5 and resolve discrepancies. If different sources of information indicate different hazardous
6 wastes are present, then sites shall include all sources of information in its records and
7 conservatively assign all potential hazardous waste numbers unless the sites choose to
8 justify an alternative assignment and document the justification in the auditable record.
9 The assignment of hazardous waste numbers shall be tracked in the auditable record to all
10 required documentation.
- 11 • Sites shall prepare and implement a written procedure to identify hazardous wastes and
12 assign the appropriate hazardous waste numbers to each waste stream. The following are
13 minimum baseline requirements/standards that site-specific procedures shall include to
14 ensure comparable and consistent characterization of hazardous waste:
- 15 – Compile all of the required information in an auditable record.
- 16 – Review the compiled information and delineate TRU mixed waste streams.
17 Delineation of waste streams must comply with the following definition: a waste
18 stream is defined as waste material generated from a single process or from an
19 activity that is similar in material, physical form, and hazardous constituents.
- 20 – Review the compiled information to determine if the waste stream is compliant with
21 the TSDF-WAC.
- 22 – Review the required information to determine if the waste is listed under 20.4.1.200
23 NMAC (incorporating 40 CFR §261), Subpart D. Assign all listed hazardous waste
24 numbers unless the sites choose to justify an alternative assignment and document the
25 justification in the auditable record.
- 26 – Review the required information to determine if the waste exhibits a hazardous
27 characteristic or may contain hazardous constituents included in the toxicity
28 characteristics specified in 20.4.1.200 NMAC (incorporating 40 CFR §261), Subpart
29 C. If a toxicity characteristic contaminant is identified and is not included as a listed
30 waste, assign the toxicity characteristic number unless data are available that
31 demonstrate that the concentration of the constituent in the waste is less than the
32 toxicity characteristic regulatory level. When data are not available, the toxicity
33 characteristic hazardous waste number for the identified hazardous constituent shall
34 be applied to the mixed waste stream.
- 35 – Review the compiled information to provide an estimate of material parameter
36 weights for each container to be stored or disposed of at WIPP.

1 For newly generated wastes, procedures shall be developed and implemented to
2 characterize hazardous waste using acceptable knowledge prior to packaging the waste.

- 3 • Sites shall ensure that results of audits of the TRU mixed waste characterization
4 programs at the site are available in the records.
- 5 • Sites shall identify all process controls (implemented to ensure that the waste contains no
6 prohibited items and to control hazardous waste content and/or physical form) that may
7 have been applied to retrievably stored waste and/or may presently be applied to newly
8 generated waste. Process controls are applied at the time of waste generation/packaging
9 to control waste content, whereas any activities performed after waste
10 generation/packaging to identify prohibited items, hazardous waste content, or physical
11 form are waste characterization activities, not process controls. The AK record must
12 contain specific process controls and supporting documentation identifying when these
13 process controls are used to control waste content. See Permit Attachment B, Section B-2
14 for programmatic requirements related to process controls.

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

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

- 23 • Acceptable knowledge information shall be compiled in an auditable record, including a
24 road map for all applicable information.
- 25 • The overview of the facility and TRU mixed waste management operations in the context
26 of the facility's mission shall be correlated to specific waste stream information.
- 27 • Correlations between waste streams, with regard to time of generation, waste generating
28 processes, and site-specific facilities shall be clearly described. For newly generated
29 wastes, the rate and quantity of waste to be generated shall be defined.
- 30 • A reference list shall be provided that identifies documents, databases, Quality Assurance
31 protocols, and other sources of information that support the acceptable knowledge
32 information.

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

1 B4-3d AK Sufficiency Determination Request Contents

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

- 5 • Identification of the scenario for which the approval is sought (Permit Attachment B,
6 Section B-0b).
- 7 • A complete AK Summary that addresses the following technical requirements:
- 8 – Executive Summary;
- 9 – Waste Stream Identification Summary, including a demonstration that the waste
10 stream has been properly delineated and meets the Permit definition of waste stream
11 (Permit Attachment B, Introduction);
- 12 – Mandatory Program Information (including, but not limited to, facility location and
13 description, mission, defense waste assessment, spent nuclear fuel and high-level
14 waste assessment, description of waste generating processes, research/development
15 [as necessary], facility support operations [as applicable], types and quantities of
16 TRU waste generated, correlation of waste streams to buildings/processes, waste
17 identification and categorization, physical form identifiers);
- 18 – Mandatory Waste Stream Information (including, but not limited to, Area and
19 Building of Generation, waste stream volume/period of generation (including, for
20 newly generated waste, the rate and quantity of waste to be generated), waste
21 generating activities, types of waste generated, material input related to physical form
22 and identification of percentage of each waste material parameter in the waste stream,
23 chemical content information including hazardous constituents and hazardous waste
24 identification, prohibited item content (including documented evidence that the waste
25 meets the TSDF-WAC Permit Conditions II.C.3.a-h), waste packaging, presence of
26 filter vents, number of layers of confinement);
- 27 – Types of supporting information gathered;
- 28 – Container specific data (if available and relevant); and
- 29 – A complete reference list including all mandatory and supporting information.
- 30 • An AK roadmap (defined as a cross reference between mandatory programmatic and
31 mandatory waste stream information, with references supporting these requirements).
- 32 • A complete reference list including all mandatory and supporting documentation.
- 33 • Relevant supporting information for the required programmatic and waste stream data
34 addressed in the AK Summary, examples of which are presented in Permit Attachment
35 B4, Section B4-2c.
- 36 • Identification of any mandatory requirements supported only by upper tier documents
37 (i.e., there is insufficient supporting data).
- 38 • Description or other means of demonstrating that the AK process described in the Permit
39 was followed (for example, AK personnel were appropriately trained; discrepancies were
40 documented, etc).

- 1 • Information showing that the generator/storage site has developed a written procedure for
2 compiling the AK information and assigning hazardous waste numbers as required in
3 Permit Attachment B4-3b.
- 4 • Information showing that the generator/storage site has assessed the AK process
5 (e.g. internal audits, Permit Attachment B4-3b).

6 The Permittees shall evaluate the Determination Request for completeness and technical
7 adequacy as specified in Permit Attachment B.

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

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

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

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

- 29 • Review existing information based on the container identification number and document
30 all differences in hazardous waste number assignments
- 31 • If differences exist in the hazardous waste numbers that were assigned, reassess and
32 document all required acceptable knowledge information (Section B4-3b) associated with
33 the new designation
- 34 • Reassess and document all sampling and analytical data associated with the waste
- 35 • Verify and document that the reassigned Waste Matrix Code was generated within the
36 specified time period, area and buildings, waste generating process, and that the process

1 material inputs are consistent with the waste material parameters identified during
2 radiography or visual examination

- 3
- Record all changes to acceptable knowledge records
 - If discrepancies exist in the acceptable knowledge information for the revised Waste Matrix Code, document the segregation of the affected portion of the waste stream, and define the actions necessary to fully characterize the waste
- 6

7 Potential toxicity characteristics for base materials that compose TRU mixed heterogeneous
8 debris (S5000) waste may be determined without destructive sampling and analysis via
9 acceptable knowledge. Sites will assign a Waste Matrix Code and waste stream to each container
10 of waste using acceptable knowledge. In lieu of sampling and analytical or other data to the
11 contrary (including headspace gas and total/TCLP analysis of solids/soils), sites shall assign the
12 toxicity characteristic hazardous waste numbers based on the presence of the constituent
13 identified by acceptable knowledge, regardless of the quantity or concentration. Procedures shall
14 describe how additions to hazardous waste numbers based on material composition are
15 documented, as necessary (Section B4-3b).

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

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

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

9 To determine the mean concentration of solvent VOCs, all headspace-gas data or homogeneous
10 waste data for a waste stream or waste stream lot (i.e., the portion of the waste stream that is
11 characterized as a unit) will be used, including data qualified with a 'J' flag (i.e., less than the
12 PRQL but greater than the method detection limit [MDL]) or qualified with a 'U' flag
13 (i.e., undetected). For data qualified with a 'U' flag, sites shall use one-half the MDL in
14 calculating the mean concentration. Because listed wastes are not defined based on
15 concentration, sites may not remove hazardous waste numbers assigned using acceptable
16 knowledge if hazardous constituents are not detected in the headspace gas or solids/soil analysis.

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

27 B4-3f Acceptable Knowledge Data Quality Requirements

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

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

1 B4-3g Audits of Acceptable Knowledge

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

12 Site-specific audit plans will be prepared by the Permittees and provided to NMED, and will
13 identify the scope of the audit, requirements to be assessed, participating personnel, activities to
14 be audited, organizations to be notified, applicable documents, and schedule. Audits will be
15 performed in accordance with written procedures and site-specific checklists that will be
16 developed by the Permittees prior to the audit and provided to NMED. The site-specific audit
17 checklists will include items associated with the compilation and evaluation of the required
18 acceptable knowledge information as specified in the checklist required by Permit
19 Attachment B6.

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

- 22 • Documentation of the process used to compile, evaluate, and record acceptable
23 knowledge is available and implemented;
- 24 • Personnel qualifications and training are documented;
- 25 • All of the required acceptable knowledge documentation specified in Section B4-2 has
26 been compiled in an auditable record;
- 27 • All of the required procedures specified in B4-3 have been developed and implemented,
28 including but not limited to:
 - 29 – A procedure exists for assigning hazardous waste numbers to waste streams in
30 accordance with Section B4-3;
 - 31 – A procedure exists for resolving discrepancies in acceptable knowledge
32 documentation in accordance with Section B4-3; and
- 33 • Results of other audits of the TRU mixed waste characterization programs at the site are
34 available in site records.

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

6 Auditors will evaluate acceptable knowledge documentation for at least one waste stream from
7 the Summary Category Group(s) being audited, and will audit acceptable knowledge traceability
8 for at least one container from the audited Summary Category Group(s). For these waste streams,
9 auditors will review all procedures and associated processes developed by the site for
10 documenting the process of compiling acceptable knowledge documentation; correlating
11 information to specific waste inventories; assigning hazardous waste numbers; and identifying,
12 resolving, and documenting discrepancies in acceptable knowledge records. The adequacy of
13 acceptable knowledge procedures and processes will be assessed and any deficiencies in
14 procedures documented in the audit report.

15 Auditors will review the acceptable knowledge documentation for selected waste streams for
16 logic, completeness, and defensibility. The criteria that will be used by auditors to evaluate the
17 logic and defensibility of the acceptable knowledge documentation include completeness and
18 traceability of the information, consistency of application of information, clarity of presentation,
19 degree of compliance with this Permit Attachment with regard to acceptable knowledge data,
20 nonconformance procedures, and oversight procedures. Auditors will evaluate compliance with
21 written site procedures for developing the acceptable knowledge record. A completeness review
22 will evaluate the availability of all required TRU mixed waste management program information
23 and TRU mixed waste stream information (Section B4-2). Records will be reviewed for
24 correlation to specific waste streams and the basis for characterizing hazardous waste. Auditors
25 will verify that sites include all required information and conservatively include all potential
26 hazardous waste numbers indicated by the acceptable knowledge records. All deficiencies in the
27 acceptable knowledge documentation will be included in the audit report.

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

33 After the audit is complete, the Permittees will provide the site with preliminary results at a
34 close-out meeting. The Permittees will prepare a final audit report that includes all observations
35 and findings identified during the audit. Sites shall respond to all audit findings and identify
36 corrective actions. Audit results will be included in the final audit report (Permit
37 Attachment B6). If acceptable knowledge procedures do not exist, the required information is not
38 available, or corrective actions (i.e., CARs) are identified associated with acceptable knowledge
39 compilation, and/or hazardous waste characterization, the Permittees will not manage, store, or
40 dispose TRU mixed waste for the subject waste summary category. Management, storage, or
41 disposal of the subject waste summary category at WIPP will not resume until the Permittees

1 find that all corrective actions have been implemented and the site complies with all applicable
2 requirements of the WAP.

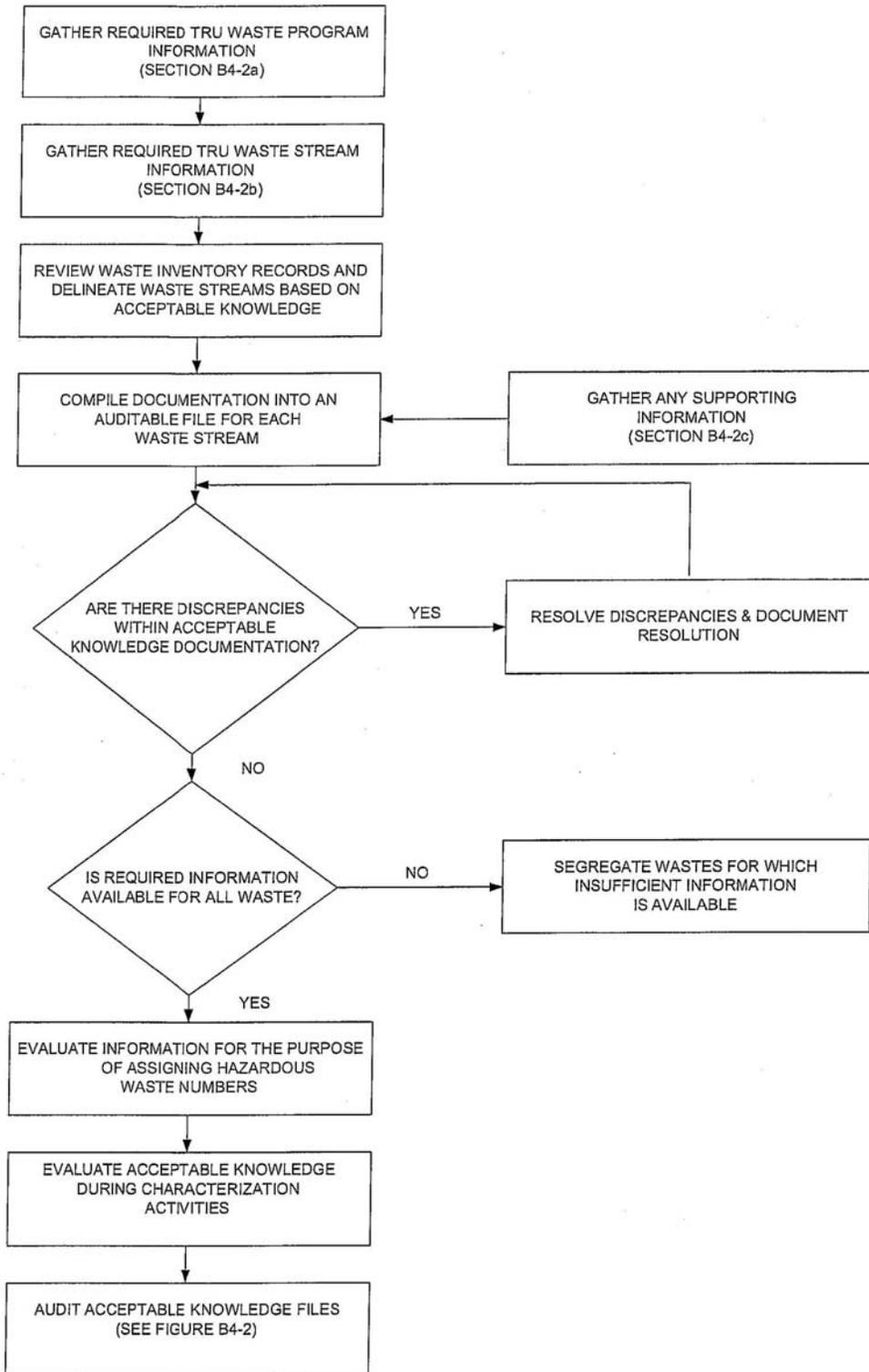
3 The National TRU Program disseminates information regarding TRU mixed waste
4 characterization requirements and program status through the WIPP Home Page. The Permittees
5 will use this web page to disseminate information regarding TRU mixed waste streams, RCRA
6 compliance, and operational and programmatic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

1

FIGURES

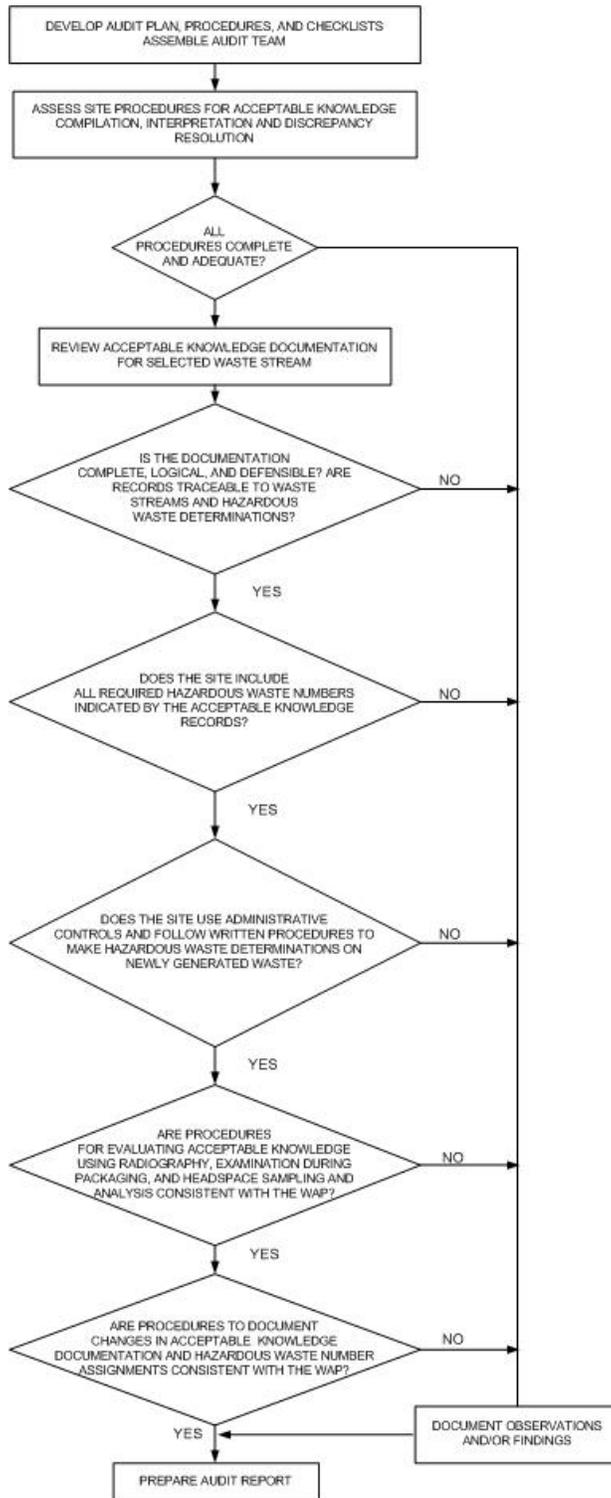
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Figure B4-1
 Compilation of Acceptable Knowledge Documentation



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Figure B4-2
 Acceptable Knowledge Auditing