

ATTACHMENT ~~B~~ C4

**TRU MIXED WASTE CHARACTERIZATION USING
ACCEPTABLE KNOWLEDGE**

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ATTACHMENT-B_C4

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1 analysis. TRU mixed waste streams shall undergo applicable provisions of the acceptable
2 knowledge process prior to management, storage, or disposal by the Permittees at WIPP.

3 BC4-2 Acceptable Knowledge Documentation

4 ~~The Permittees-DOE~~ shall obtain from each ~~Department of Energy (DOE)-DOE~~ TRU mixed
5 waste 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'-DOE's~~
10 audit of a site (Section ~~B C~~4-3g). The consistent presentation of acceptable knowledge
11 documentation among sites in auditable records¹ will allow ~~the Permittees-DOE~~ to verify the
12 completeness and adequacy of acceptable knowledge for TRU mixed waste characterization
13 during the audit process. ~~The Permittees-DOE~~ shall implement the acceptable knowledge
14 process as specified in this Permit to characterize TRU mixed wastes and obtain sufficient
15 waste characterization data to demonstrate compliance with the Permit. The New Mexico
16 Environment Department (**NMED**) may independently validate the implementation of and
17 compliance with applicable provisions of the WAP at each generator/storage site by
18 participation in the ~~Permittees'-DOE~~ Audit and Surveillance Program (Permit Attachment ~~B C~~6).
19 ~~The Permittees-DOE~~ shall provide NMED with current audit schedules and notify NMED in
20 writing no later than thirty (30) calendar days prior to each audit. NMED may choose to
21 accompany ~~the Permittees-DOE~~ on any audit of the WAP implementation.

22 The following sections include the information ~~the Permittees-DOE~~ 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 ~~B C~~4-2c, **Supporting**
26 **Additional** Acceptable Knowledge Information). If the required information is not available for a
27 particular waste stream, the waste stream will not be eligible for an AK Sufficiency
28 Determination as specified in Section ~~B C~~4-3d.

29 BC4-2a 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 BC4-2b Required TRU Mixed Waste Stream Information

15 ~~The Permittees DOE~~ may use acceptable knowledge to delineate site-specific waste streams.
16 For each TRU mixed waste stream, ~~the Permittees DOE~~ shall require sites to compile all
17 process information and data that support the acceptable knowledge used to characterize that
18 waste 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 DOE~~. At a minimum, the waste process information shall include the following
21 written 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 • Documentation demonstrating how the site has historically managed the waste,
29 including the historical regulatory status of the waste (i.e., TRU mixed versus TRU
30 non-mixed waste)
- 31 • Process flow diagrams (e.g., a diagram illustrating glove boxes from a specific building
32 to a size reduction facility to a container storage area). In the case of
33 research/development, analytical laboratory waste, or other similar processes where
34 process flow diagrams cannot be created, a description of the waste generating
35 processes, rather than a formal process flow diagram, may be included if this
36 modification is justified and the justification is placed in the auditable record

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

8 The acceptable knowledge written record shall include a summary that identifies all sources of
9 waste characterization information used to delineate the waste stream. The basis and rationale
10 for delineating each waste stream, based on the parameters of interest, shall be clearly
11 summarized and traceable to referenced documents. Assumptions made in delineating each
12 waste stream also shall be identified and justified. If discrepancies exist between required
13 information, then sites ~~shall~~ may consider applying all hazardous waste numbers indicated by
14 the information to the subject waste stream, but must assess and evaluate the information to
15 determine the appropriate hazardous waste numbers consistent with RCRA requirements
16 unless the sites choose to justify an alternative assignment and document the justification in the
17 auditable record. The Permittees DOE shall obtain from each site, at a minimum, procedures
18 that comply with the following acceptable knowledge requirements:

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

1 BC4-2c Supporting-Additional Acceptable Knowledge Information

2 The generator/storage sites shall obtain ~~supporting-additional~~ acceptable knowledge
3 information. The amount and type of ~~supporting-additional~~ information is site-specific and cannot
4 be mandated, but sites shall collect information as appropriate to augment required information
5 and provide any other information obtained to further delineate waste streams. Adequacy of
6 ~~supporting-this~~ information shall be assessed by ~~the Permittees-DOE~~ during audits (Section-B
7 C4-3g). Sites will use this information to compile the acceptable knowledge written record.
8 Supporting-Additional acceptable knowledge documentation that may will be used (if available)
9 in addition to the required information specified above include, but are not limited to, the
10 following information:

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

- 1 • Laboratory notebooks that detail the research processes and raw materials used in an
2 experiment

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

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

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

1 ~~supporting additional~~ information and the required information, then sites ~~shall apply may~~
2 ~~consider applying~~ all hazardous waste numbers indicated by the ~~supporting additional~~
3 information to the subject waste stream, ~~but must assess and evaluate the information to~~
4 ~~determine the appropriate hazardous waste numbers consistent with RCRA requirements. All~~
5 ~~information considered must be documented and placed in the auditable record, including~~
6 ~~applicable discrepancy resolution documentation unless the sites choose to justify an alternative~~
7 ~~assignment and document the justification in the auditable record.~~

8 BC4-3 Acceptable Knowledge Training, Procedures and Other Requirements

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

17 BC4-3a Qualifications and Training Requirements

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

- 21 • WIPP WAP in Permit Attachment ~~B C~~ and the TSDf-WAC specified in this permit
- 22 • State and Federal RCRA regulations associated with solid and hazardous waste
23 characterization
- 24 • Discrepancy resolution and reporting processes
- 25 • Site-specific procedures associated with waste characterization using acceptable
26 knowledge

27 BC4-3b Acceptable Knowledge Assembly and Compilation

28 ~~The Permittees DOE~~ shall obtain from sites acceptable knowledge procedures which require
29 consistent application of the acceptable knowledge process and requirements. Site-specific
30 acceptable knowledge procedures shall address the following:

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

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

~~characteristic hazardous waste number for the identified hazardous constituent shall be applied to the mixed waste stream.~~

- Review the compiled information to provide an estimate of material parameter weights for each container to be stored or disposed of at WIPP.

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

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

BC4-3c Criteria for Assembling an Acceptable Knowledge Record and Delineating the Waste Stream

Figure B_C-4-1 provides an overview of the process for assembling acceptable knowledge documentation into an auditable record. The first step is to assemble all of the required acceptable knowledge information and any supporting additional information regarding the materials and processes that generate a specific waste stream. The Permittees-DOE shall require the sites to implement procedures which comply with the following criteria to establish acceptable knowledge records:

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

1 Container inventories for TRU mixed waste currently in retrievable storage shall be delineated
2 into waste streams by correlating the container identification to all of the required acceptable
3 knowledge information and any supporting-additional acceptable knowledge information.

4 BC4-3d AK Sufficiency Determination Request Contents

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

- 8 • Identification of the scenario for which the approval is sought (Permit Attachment B C,
9 Section B C-0b).
- 10 • A complete AK Summary that addresses the following technical requirements:
 - 11 – Executive Summary;
 - 12 – Waste Stream Identification Summary, including a demonstration that the waste
13 stream has been properly delineated and meets the Permit definition of waste
14 stream (Permit Attachment B C, Introduction);
 - 15 – Mandatory Program Information (including, but not limited to, facility location and
16 description, mission, defense waste assessment, spent nuclear fuel and high-level
17 waste assessment, description of waste generating processes,
18 research/development [as necessary], facility support operations [as applicable],
19 types and quantities of TRU waste generated, correlation of waste streams to
20 buildings/processes, waste identification and categorization, physical form
21 identifiers);
 - 22 – Mandatory Waste Stream Information (including, but not limited to, Area and
23 Building of Generation, waste stream volume/period of generation (including, for
24 newly generated waste, the rate and quantity of waste to be generated), waste
25 generating activities, types of waste generated, material input related to physical
26 form and identification of percentage of each waste material parameter in the
27 waste stream, chemical content information including hazardous constituents and
28 hazardous waste identification, prohibited item content (including documented
29 evidence that the waste meets the TSDF-WAC Permit ~~Condition Sections II.C.3.a-~~
30 § 2.3.3.1 through 2.3.3.10), waste packaging, presence of filter vents, number of
31 layers of confinement);
 - 32 – Types of supporting-additional information gathered;
 - 33 – Container specific data (if available and relevant); and
 - 34 – A complete reference list including all mandatory and supporting-additional
35 information.
- 36 • An AK roadmap (defined as a cross reference between mandatory programmatic and
37 mandatory waste stream information, with references supporting these requirements).

- 1 • A complete reference list including all mandatory and ~~supporting~~ additional
2 documentation.
- 3 • Additional Rrelevant ~~supporting~~ information for the required programmatic and waste
4 stream data addressed in the AK Summary, examples of which are presented in
5 Permit Attachment B C4, Section B C4-2c.
- 6 • Identification of any mandatory requirements supported only by upper tier documents
7 (i.e., there is insufficient supporting data).
- 8 • Description or other means of demonstrating that the AK process described in the
9 Permit was followed (for example, AK personnel were appropriately trained;
10 discrepancies were documented, etc).
- 11 • Information showing that the generator/storage site has developed a written procedure
12 for compiling the AK information and assigning hazardous waste numbers as required
13 in Permit Attachment B C4-3b.
- 14 • Information showing that the generator/storage site has assessed the AK process
15 (e.g. internal audits, Permit Attachment B C4-3b).

16 ~~The Permittees DOE~~ shall evaluate the Determination Request for completeness and technical
17 adequacy as specified in Permit Attachment B C.

18 BC4-3e Requirements for Re-evaluating Acceptable Knowledge Information

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

24 The Waste Stream Profile Form (**WSPF**) and Characterization Information Summary (including
25 the acceptable knowledge summary) will be reviewed for each waste stream prior to ~~Permittee~~
26 DOE approval of the WSPF. ~~The Permittees DOE~~ review will ensure that the submitted AK
27 information was collected under procedures that ensure implementation of the WAP, provides
28 data sufficient to meet the DQOs in Section B C-4a(1), and allow ~~the Permittees DOE~~ to
29 demonstrate compliance with the waste analysis requirements of the Permit. A detailed
30 discussion of ~~the Permittees' DOE's~~ waste stream review and approval process is provided in
31 Section B C-1d.

32 ~~The Permittees DOE~~ shall require sites to establish procedures for reevaluating acceptable
33 knowledge if the results of waste confirmation indicate that the waste to be shipped does not
34 match the approved waste stream, or if data obtained from radiography or visual examination
35 for waste streams without an AK Sufficiency Determination exhibit this discrepancy. Site
36 procedures shall describe how the waste is reassigned, acceptable knowledge reevaluated, and
37 appropriate hazardous waste numbers assigned. If the reevaluation requires that the Waste
38 Matrix Code be changed for the waste stream or the waste does not match the approved waste
39 stream, the following minimum steps shall be taken to reevaluate acceptable knowledge:

- 1 • Review existing information based on the container identification number and
2 document all differences in hazardous waste number assignments
- 3 • If differences exist in the hazardous waste numbers that were assigned, reassess and
4 document all required acceptable knowledge information (Section B_C4-3b) associated
5 with the new designation
- 6 • Reassess and document all sampling and analytical data associated with the waste
- 7 • Verify and document that the reassigned Waste Matrix Code was generated within the
8 specified time period, area and buildings, waste generating process, and that the
9 process material inputs are consistent with the waste material parameters identified
10 during radiography or visual examination
- 11 • Record all changes to acceptable knowledge records
- 12 • If discrepancies exist in the acceptable knowledge information for the revised Waste
13 Matrix Code, document the segregation of the affected portion of the waste stream,
14 and define the actions necessary to fully characterize the waste

15 Potential toxicity characteristics for base materials that compose TRU mixed heterogeneous
16 debris (S5000) waste may be determined without destructive sampling and analysis via
17 acceptable knowledge. Sites will assign a Waste Matrix Code and waste stream to each
18 container of waste using acceptable knowledge. Sites shall assign the toxicity characteristic
19 hazardous waste numbers consistent with RCRA requirements. If a toxicity characteristic
20 underlying hazardous constituent is identified during AK, the potential assignment of a
21 hazardous waste number must be evaluated and the results placed in the AK record. In lieu of
22 sampling and analytical or other data to the contrary (including headspace gas and total/TCLP
23 analysis of solids/soils), sites shall assign the toxicity characteristic hazardous waste numbers
24 based on the presence of the constituent identified by acceptable knowledge, regardless of the
25 quantity or concentration. Procedures shall describe how additions to hazardous waste numbers
26 based on material composition are documented, as necessary (Section B_C4-3b).

27 The Permittees DOE shall require sites to use acceptable knowledge to identify spent solvents
28 associated with each TRU mixed waste stream or waste stream lot. Headspace-gas data will be
29 used to resolve the assignment of EPA F-listed hazardous waste numbers to debris waste
30 streams when waste streams do not have an AK Sufficiency Determination approved by the
31 Permittees DOE. In this case, sites shall assign F-listed hazardous waste numbers (20.4.1.200
32 NMAC, incorporating 40 CFR §261.31) by evaluating the average concentrations of each VOC
33 detected in container headspace gas for each waste stream or waste stream lot using the upper
34 90 percent confidence limit (**UCL₉₀**). The UCL₉₀ for the mean concentration shall be compared
35 to the program required quantitation limit (**PRQL**) for the constituent. If the UCL₉₀ for the mean
36 concentration exceeds the PRQL, sites shall reevaluate their acceptable knowledge information
37 and determine the potential source of the constituent. Sites shall provide documentation to
38 support any determination that F-listed organic constituents are associated with packaging
39 materials, radiolysis, or other uses not consistent with solvent use. If the source of the detected
40 F-listed solvents can not be identified, the appropriate spent solvent hazardous waste number
41 will be conservatively applied to the waste stream. In the case of applicable toxicity
42 characteristic VOCs and non-toxic F003 constituents, generator/storage sites may assess

1 whether the head space gas concentration would render the waste non-hazardous for those
2 characteristics and change the initial acceptable knowledge determination accordingly.

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

11 If the site determines that the source of the F-listed constituent is a spent solvent used in the
12 process or is determined to be the result of mixing a listed waste with a solid waste during waste
13 packaging, or applicable toxicity characteristic or non-toxic F003 wastes are present in excess
14 of regulatory levels, then the site will either: 1) assign the applicable listed hazardous waste
15 number to the entire waste stream, or 2) segregate the drums containing detectable
16 concentrations of the solvent into a separate waste stream and assign applicable hazardous
17 waste numbers. Each site shall document, justify, and consistently delineate waste streams and
18 assign hazardous waste numbers as required in this permit and must consider all generator-
19 specific waste streams and hazardous waste number assignments. The site must also consider
20 based on site-specific permit requirements and other state-enforced agreements in this
21 analysis.

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

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

41 BC4-3f Acceptable Knowledge Data Quality Requirements

42 The data quality objectives for sampling and analysis techniques are provided in Permit
43 Attachment B_C3. Analytical results will be used to augment the characterization of wastes
44 based on acceptable knowledge. To ensure that the acceptable knowledge process is

1 | consistently applied, ~~the Permittees-DOE~~ shall require sites to comply with the data quality
2 | requirements for acceptable knowledge documentation in Permit Attachment ~~B C~~3.

3 | Each site shall address quality control by tracking its performance with regard to the use of
4 | acceptable knowledge by: 1) assessing the frequency of inconsistencies among information,
5 | and 2) documenting the results of waste discrepancies identified by the generator/storage site
6 | during waste characterization or ~~the Permittees-DOE~~ during waste confirmation using
7 | radiography, review of radiography audio/video recordings, visual examination, or review of
8 | visual examination records. In addition, the acceptable knowledge process and waste stream
9 | documentation shall be evaluated through internal assessments by generator/storage site
10 | quality assurance organizations.

11 | BC4-3g Audits of Acceptable Knowledge

12 | ~~The Permittees-DOE~~ will conduct an initial audit of each site prior to certifying the site for
13 | shipment of TRU mixed waste to the WIPP facility. This initial audit will establish an approved
14 | baseline that will be reassessed annually ~~by the Permittees DOE~~. These audits will verify
15 | compliance with the requirements specified in the WAP (Permit Attachment ~~B C~~). The audits will
16 | be used to verify compliance with the compilation, application, and interpretation requirements
17 | of acceptable knowledge information specified in this Permit at all sites, and to evaluate the
18 | completeness and defensibility of site-specific acceptable knowledge documentation related to
19 | hazardous waste characterization. Permit Attachment ~~B C~~6 gives a description of the overall
20 | audit program and a required checklist. Figure ~~B C~~4-2 includes the primary steps associated
21 | with the audit process of acceptable knowledge.

22 | Site-specific audit plans will be prepared by ~~the Permittees-DOE~~ and provided to NMED, and
23 | will identify the scope of the audit, requirements to be assessed, participating personnel,
24 | activities to be audited, organizations to be notified, applicable documents, and schedule. Audits
25 | will be performed in accordance with written procedures and site-specific checklists that will be
26 | developed by ~~the Permittees-DOE~~ prior to the audit and provided to NMED. The site-specific
27 | audit checklists will include items associated with the compilation and evaluation of the required
28 | acceptable knowledge information as specified in the checklist required by Permit Attachment ~~B~~
29 | ~~C~~6.

30 | Audit checklists shall include Table B6-3 in Permit Attachment ~~B C~~6, and will include but not be
31 | limited to the following elements for review during the audit:

- 32 | • Documentation of the process used to compile, evaluate, and record acceptable
33 | knowledge is available and implemented;
- 34 | • Personnel qualifications and training are documented;
- 35 | • All of the required acceptable knowledge documentation specified in Section ~~B C~~4-2
36 | has been compiled in an auditable record;
- 37 | • All of the required procedures specified in ~~B C~~4-3 have been developed and
38 | implemented, including but not limited to:
 - 39 | – A procedure exists for assigning hazardous waste numbers to waste streams in
40 | accordance with Section ~~B C~~4-3;

1 - A procedure exists for resolving discrepancies in acceptable knowledge
2 documentation in accordance with Section ~~B_C~~4-3; and

- 3 • Results of other audits of the TRU mixed waste characterization programs at the site
4 are available in site records.

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

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

19 Auditors will review the acceptable knowledge documentation for selected waste streams for
20 logic, completeness, and defensibility. The criteria that will be used by auditors to evaluate the
21 logic and defensibility of the acceptable knowledge documentation include completeness and
22 traceability of the information, consistency of application of information, clarity of presentation,
23 degree of compliance with this Permit Attachment with regard to acceptable knowledge data,
24 nonconformance procedures, and oversight procedures. Auditors will evaluate compliance with
25 written site procedures for developing the acceptable knowledge record. A completeness review
26 will evaluate the availability of all required TRU mixed waste management program information
27 and TRU mixed waste stream information (Section ~~B_C~~4-2). Records will be reviewed for
28 correlation to specific waste streams and the basis for characterizing hazardous waste. Auditors
29 will verify that sites include all required information and ~~conservatively include all potential~~
30 assigned appropriate hazardous waste numbers as indicated by the acceptable knowledge
31 records and consistent with RCRA requirements. All deficiencies in the acceptable knowledge
32 documentation will be included in the audit report.

33 Auditors will verify and document that sites use administrative controls and follow written
34 procedures to characterize hazardous waste for newly-generated and retrievably stored wastes.
35 Procedures to document changes in acceptable knowledge documentation and changes to
36 hazardous waste number assignments to specific waste streams also will be evaluated for
37 compliance with the WAP (Permit Attachment ~~B_C~~).

38 After the audit is complete, ~~the Permittees DOE~~ will provide the site with preliminary results at a
39 close-out meeting. ~~The Permittees DOE~~ will prepare a final audit report that includes all
40 observations and findings identified during the audit. Sites shall respond to all audit findings and
41 identify corrective actions. Audit results will be included in the final audit report (Permit
42 Attachment ~~B_C~~6). If acceptable knowledge procedures do not exist, the required information is
43 not available, or corrective actions (i.e., CARs) are identified associated with acceptable
44 knowledge compilation, and/or hazardous waste characterization, the Permittees will not

1 manage, store, or dispose TRU mixed waste for the subject waste summary category.
2 Management, storage, or disposal of the subject waste summary category at WIPP will not
3 resume until ~~the Permittees-DOE~~ find that all corrective actions have been implemented and the
4 site complies with all applicable requirements of the WAP.

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

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1

FIGURES

1

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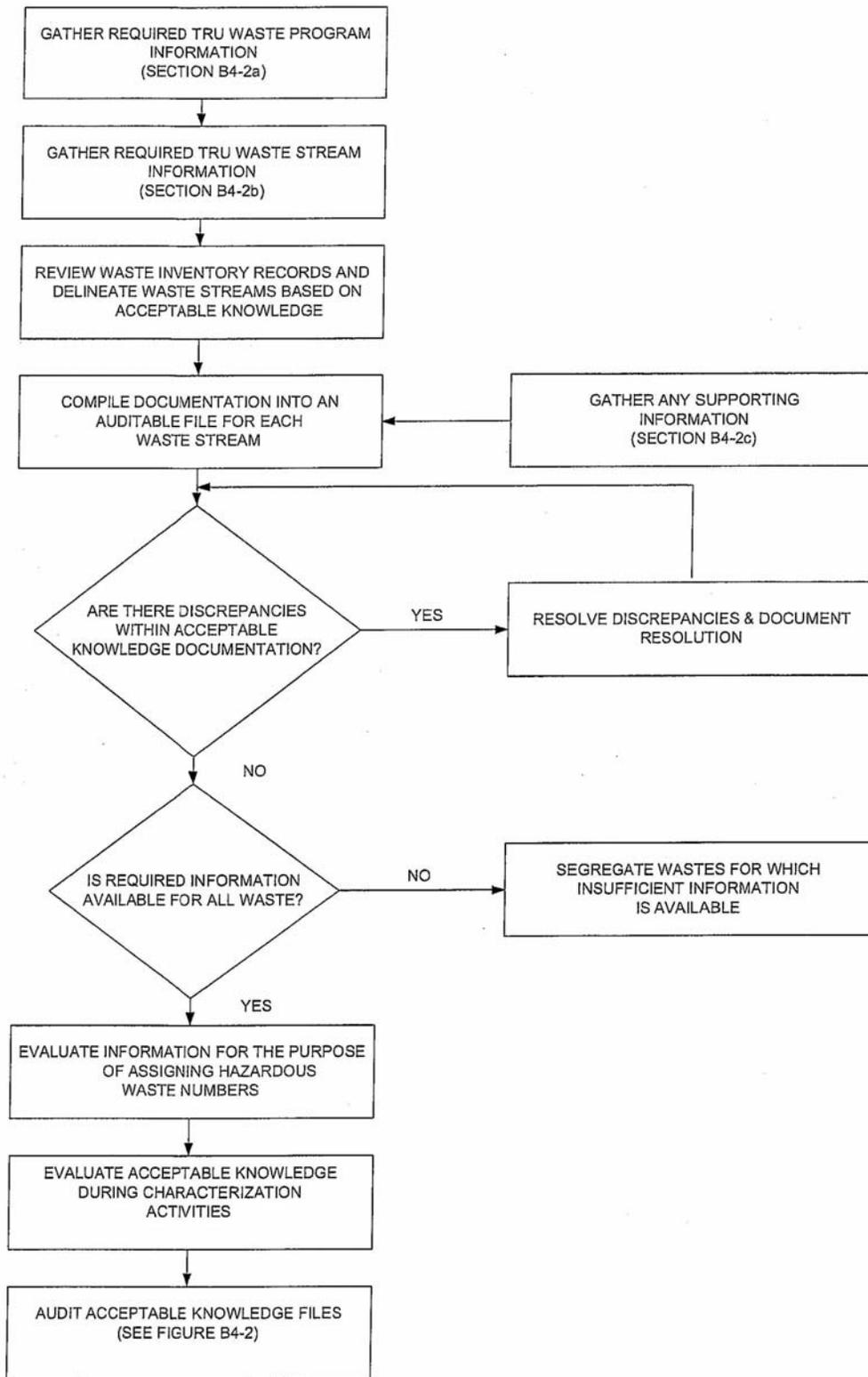


Figure B C4-1
Compilation of Acceptable Knowledge Documentation

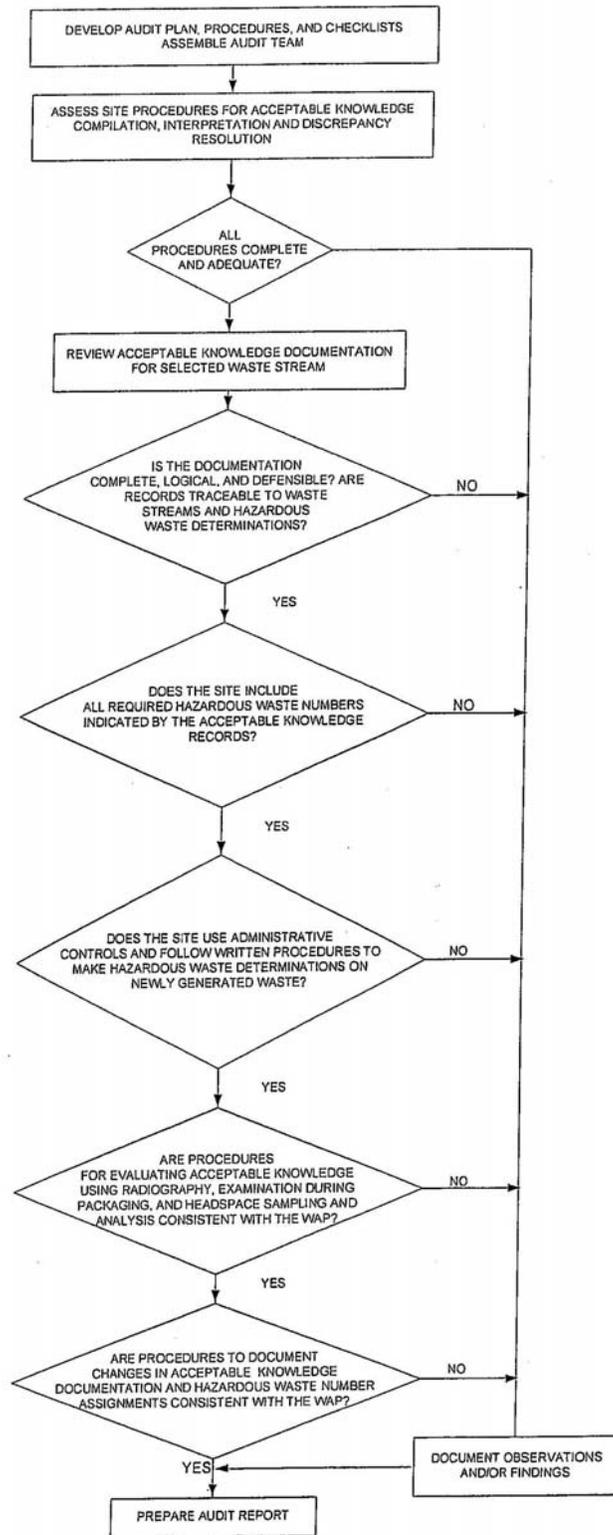


Figure B C4-2
Acceptable Knowledge Auditing