

ATTACHMENT C4

**TRU MIXED WASTE CHARACTERIZATION USING
ACCEPTABLE KNOWLEDGE**

Waste Isolation Pilot Plant
Hazardous Waste Permit
March 13, 2013

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TABLE OF CONTENTS

| | | |
|-------|--|----|
| C4-1 | Introduction | 1 |
| C4-2 | Acceptable Knowledge Documentation | 2 |
| C4-2a | Required TRU Mixed Waste Management Program Information..... | 2 |
| C4-2b | Required TRU Mixed Waste Stream Information..... | 3 |
| C4-2c | Additional Acceptable Knowledge Information | 4 |
| C4-3 | Acceptable Knowledge Training, Procedures and Other Requirements..... | 6 |
| C4-3a | Qualifications and Training Requirements..... | 6 |
| C4-3b | Acceptable Knowledge Assembly and Compilation..... | 6 |
| C4-3c | Criteria for Assembling an Acceptable Knowledge Record and Delineating the Waste Stream | 8 |
| C4-3d | AK Sufficiency Determination Request Contents..... | 8 |
| C4-3e | Requirements for Re-evaluating Acceptable Knowledge Information | 10 |
| C4-3f | Acceptable Knowledge Data Quality Requirements | 11 |
| C4-3g | Audits of Acceptable Knowledge..... | 11 |

LIST OF FIGURES

Figure

Title

| | |
|-------------|---|
| Figure C4-1 | Compilation of Acceptable Knowledge Documentation |
| Figure C4-2 | Acceptable Knowledge Auditing |

1 **ATTACHMENT C4**

2 **TRU MIXED WASTE CHARACTERIZATION USING**
3 **ACCEPTABLE KNOWLEDGE**

4 C4-1 Introduction

5 The Resource Conservation and Recovery Act (**RCRA**) regulations codified in 40 CFR Parts
6 260 through 265, 268, and 270, and the New Mexico Hazardous Waste Management
7 Regulations in 20.4.1 NMAC Subparts 100 through 600, Subpart 800, and Subpart 900,
8 authorize the use of acceptable knowledge (**AK**) in appropriate circumstances by waste
9 generators, or treatment, storage, or disposal facilities to characterize hazardous waste.
10 Acceptable knowledge is described in *Waste Analysis: EPA Guidance Manual for Facilities That*
11 *Generate, Treat, Store and Dispose of Hazardous Waste* (EPA, 1994). Acceptable knowledge,
12 as an alternative to sampling and analysis, can be used to meet all or part of the waste
13 characterization requirements under the RCRA (EPA, 1994).

14 EPA's 1994 Waste Analysis Guidance Manual broadly defines the term "acceptable knowledge"
15 to include process knowledge, whereby detailed information on the wastes is obtained from
16 existing published or documented waste analysis data or studies conducted on hazardous
17 waste generated by processes similar to that which generated the waste; facility records of
18 analysis performed before the effective date of RCRA; and waste analysis data obtained from
19 generators of similar wastes that send their wastes off-site for treatment, storage, or disposal
20 (EPA, 1994). If a generator/storage site determines that AK alone is insufficient to accurately
21 characterize a waste, the site may use radiography and/or visual examination (specified in
22 Permit Attachment C1) to complete the waste characterization process and satisfy the
23 requirements of the Waste Analysis Plan (**WAP**) specified in Permit Attachment C. Acceptable
24 knowledge is used in TRU mixed waste characterization activities in five ways:

- 25
- To delineate TRU mixed waste streams
 - 26 • To assess whether TRU mixed wastes comply with the applicable requirements of the
27 Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (**TSDF-WAC**)
 - 28 • To assess whether TRU mixed wastes exhibit a hazardous characteristic (20.4.1.200
29 NMAC, incorporating 40 CFR §261 Subpart C)
 - 30 • To assess whether TRU mixed wastes are listed (20.4.1.200 NMAC, incorporating
31 40 CFR §261 Subpart D)
 - 32 • To estimate waste material parameter weights

33 Radiography and/or VE may be performed to augment the characterization of wastes based on
34 acceptable knowledge when an AK Sufficiency Determination has not been requested by the
35 generator/storage site or, if requested, has not been granted by the U.S. Department of Energy
36 (**DOE**) (see Section C4-3d). TRU mixed waste streams shall undergo applicable provisions of
37 the acceptable knowledge process prior to management, storage, or disposal by the Permittees
38 at WIPP.

1 C4-2 Acceptable Knowledge Documentation

2 The Permittees shall obtain from each DOE TRU mixed waste generator/storage site (**site**) a
3 logical sequence of acceptable knowledge information that progresses from general facility
4 information (TRU Mixed Waste Management Program Information) to more detailed waste-
5 specific information (TRU Mixed Waste Stream Information). Traceability of acceptable
6 knowledge information for a selected container in the audited Waste Summary Category
7 Group(s) will be examined during DOE's audit of a site (Section C4-3g). The consistent
8 presentation of acceptable knowledge documentation among sites in auditable records¹ will
9 allow DOE to verify the completeness and adequacy of acceptable knowledge for TRU mixed
10 waste characterization during the audit process. The Permittees shall require sites to implement
11 the acceptable knowledge process as specified in this Permit to characterize TRU mixed wastes
12 and obtain sufficient waste characterization data to demonstrate compliance with the Permit.
13 The New Mexico Environment Department (**NMED**) may independently validate the
14 implementation of and compliance with applicable provisions of the WAP at each
15 generator/storage site by participation in the Audit and Surveillance Program (Permit
16 Attachment C6). DOE shall provide NMED with current audit schedules and notify NMED in
17 writing no later than thirty (30) calendar days prior to each audit. NMED may choose to
18 accompany DOE on any audit of the WAP implementation.

19 The following sections include the information the Permittees will require for each site to
20 characterize TRU mixed waste using acceptable knowledge. Because waste generating
21 processes are site-specific, sites shall, as necessary, augment the required acceptable
22 knowledge records with additional supporting information (see Section C4-2c, Additional
23 Acceptable Knowledge Information). If the required information is not available for a particular
24 waste stream, the waste stream will not be eligible for an AK Sufficiency Determination as
25 specified in Section C4-3d.

26 C4-2a Required TRU Mixed Waste Management Program Information

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

- 34 • Map of the site with the areas and facilities involved in TRU mixed waste generation,
35 treatment, and storage identified
- 36 • Facility mission description as related to TRU mixed waste generation and
37 management (e.g., nuclear weapons research may involve metallurgy, radiochemistry,
38 and nuclear physics operations that result in specific waste streams)

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

11 C4-2b Required TRU Mixed Waste Stream Information

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

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

1 information demonstrating neutralization of U134 [hydrofluoric acid] and waste
2 compatibility)

3 The acceptable knowledge written record shall include a summary that identifies all sources of
4 waste characterization information used to delineate the waste stream. The basis and rationale
5 for delineating each waste stream, based on the parameters of interest, shall be clearly
6 summarized and traceable to referenced documents. Assumptions made in delineating each
7 waste stream also shall be identified and justified. If discrepancies exist between required
8 information, then sites may consider applying all hazardous waste numbers indicated by the
9 information to the subject waste stream, but must assess and evaluate the information to
10 determine the appropriate hazardous waste numbers consistent with RCRA requirements. The
11 Permittees shall obtain from each site, at a minimum, procedures that comply with the following
12 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 visual examination and/or radiography, if applicable
- 17 • For newly generated waste, procedures describing process controls used to ensure
18 prohibited items (specified in the WAP, Permit Attachment C) are documented and
19 managed
- 20 • Procedures to ensure radiography and visual examination include a list of prohibited
21 items that the operator shall verify are not present in each container (e.g., liquid
22 exceeding TSDF-WAC limits, corrosives, ignitables, reactives, and incompatible
23 wastes)
- 24 • Procedures to document how changes to Waste Matrix Codes, waste stream
25 assignment, and associated Environmental Protection Agency (**EPA**) hazardous waste
26 numbers based on material composition are documented for any waste
- 27 • Procedures that ensure the assignment of EPA hazardous waste numbers is
28 appropriate, consistent with RCRA requirements, and considers site historical waste
29 management
- 30 • Procedures for estimating waste material parameter weights

31 C4-2c Additional Acceptable Knowledge Information

32 The generator/storage sites shall obtain additional acceptable knowledge information. Sites
33 shall collect information as appropriate to augment required information and provide any other
34 information obtained to further delineate waste streams. Adequacy of this information shall be
35 assessed by DOE during audits (Section C4-3g). Sites will use this information to compile the
36 acceptable knowledge written record.

1 All additional specific, relevant acceptable knowledge documentation assembled and used in
2 the acceptable knowledge process, whether it supports or contradicts any required acceptable
3 knowledge documentation, shall be identified and an explanation provided for its use (e.g.,
4 identification of a toxicity characteristic). Additional documentation may be used to further
5 document the rationale for the hazardous characterization results. The collection and use of
6 additional information shall be assessed by DOE during site audits to ensure that hazardous
7 waste characterization is supported, as necessary, by such information. Similar to required
8 information, if discrepancies exist between additional information and the required information,
9 then sites may consider applying all hazardous waste numbers indicated by the additional
10 information to the subject waste stream, but must assess and evaluate the information to
11 determine the appropriate hazardous waste numbers consistent with RCRA requirements. All
12 information considered must be documented and placed in the auditable record, including
13 applicable discrepancy resolution documentation.

14 Additional acceptable knowledge documentation includes, but is not limited to, the following
15 information:

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

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

3 C4-3 Acceptable Knowledge Training, Procedures and Other Requirements

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

12 C4-3a Qualifications and Training Requirements

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

- 16 • WIPP WAP in Permit Attachment C 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 C4-3b Acceptable Knowledge Assembly and Compilation

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

- 26 • Sites shall prepare and implement a written procedure outlining the specific
27 methodology used to assemble acceptable knowledge records, including the origin of
28 the documentation, how it will be used, and any limitations associated with the
29 information (e.g., identify the purpose and scope of a study that included limited
30 sampling and analysis data).
- 31 • Sites shall develop and implement a written procedure to compile the required
32 acceptable knowledge record.
- 33 • Sites shall develop and implement a written procedure that ensures unacceptable
34 wastes (e.g., reactive, ignitable, corrosive) are identified and segregated from TRU
35 mixed waste populations sent to WIPP.

- 1 • Sites shall prepare and implement a written procedure to evaluate acceptable
2 knowledge and resolve discrepancies. For example, if different sources of information
3 indicate different hazardous wastes are present, then sites shall include all sources of
4 information in its records and may choose to either conservatively assign hazardous
5 waste numbers or assign only those numbers deemed appropriate and consistent with
6 RCRA requirements. All information used to justify assignment of hazardous waste
7 numbers must be placed in the auditable record. Further, the assignment of hazardous
8 waste numbers shall be tracked in the auditable record to all required documentation.

- 9 • Sites shall prepare and implement a written procedure to identify hazardous wastes
10 and assign the appropriate hazardous waste numbers to each waste stream. The
11 following are minimum baseline requirements/standards that site-specific procedures
12 shall include to ensure comparable and consistent characterization of hazardous
13 waste:
 - 14 – Compile all of the required information in an auditable record.
 - 15 – Review the compiled information and delineate waste streams. Delineation of
16 waste streams must comply with the definition in Permit Attachment C, Section C-
17 0a, and justify combining waste historically managed separately as TRU mixed and
18 TRU non-mixed waste streams into a single waste stream.
 - 19 – Review the compiled information to determine if the waste stream is compliant with
20 the TSDF-WAC.
 - 21 – Review the required information to determine if the waste is listed under 20.4.1.200
22 NMAC (incorporating 40 CFR §261), Subpart D. Assign all listed hazardous waste
23 numbers unless the sites choose to justify an alternative assignment and
24 document the justification in the auditable record.
 - 25 – Review the required information to determine if the waste exhibits a hazardous
26 characteristic or may contain hazardous constituents included in the toxicity
27 characteristics specified in 20.4.1.200 NMAC (incorporating 40 CFR §261),
28 Subpart C. If a toxicity characteristic contaminant is identified and is not included
29 as a listed waste, sites may evaluate available data and assign the toxicity
30 characteristic hazardous waste number consistent with RCRA requirements. All
31 data examined to reach the hazardous waste number determination must be
32 placed in the auditable record and must present a clear justification for the
33 hazardous waste number analyses.
 - 34 – Review the compiled information to provide an estimate of material parameter
35 weights for each container to be stored or disposed of at WIPP.

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

- 39 • Sites shall ensure that results of audits of the TRU mixed waste characterization
40 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 C, Section C-2 for programmatic requirements related to process controls.

C4-3c Criteria for Assembling an Acceptable Knowledge Record and Delineating the Waste Stream

Figure C4-1 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 additional information regarding the materials and processes that generate a specific waste stream. The Permittees shall require the sites to implement procedures which comply with the following criteria to establish acceptable knowledge records:

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

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

C4-3d AK Sufficiency Determination Request Contents

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

- A complete AK Summary that addresses the following technical requirements:
 - Executive Summary;

- 1 – Waste Stream Identification Summary, including a demonstration that the waste
2 stream has been properly delineated and meets the Permit definition of waste
3 stream (Permit Attachment C, Introduction);
- 4 – Mandatory Program Information (including, but not limited to, facility location and
5 description, mission, defense waste assessment, spent nuclear fuel and high-level
6 waste assessment, description of waste generating processes,
7 research/development [as necessary], facility support operations [as applicable],
8 types and quantities of TRU waste generated, correlation of waste streams to
9 buildings/processes, waste identification and categorization, physical form
10 identifiers);
- 11 – Mandatory Waste Stream Information (including, but not limited to, Area and
12 Building of Generation, waste stream volume/period of generation (including, for
13 newly generated waste, the rate and quantity of waste to be generated), waste
14 generating activities, types of waste generated, material input related to physical
15 form and identification of percentage of each waste material parameter in the
16 waste stream, chemical content information including hazardous constituents and
17 hazardous waste identification, prohibited item content (including documented
18 evidence that the waste meets the TSDF-WAC Permit Sections 2.3.3.1 through
19 2.3.3.10), waste packaging, presence of filter vents, number of layers of
20 confinement);
- 21 – Types of additional information gathered;
- 22 – Container specific data (if available and relevant); and
- 23 – A complete reference list including all mandatory and additional information.
- 24 • An AK roadmap (defined as a cross reference between mandatory programmatic and
25 mandatory waste stream information, with references supporting these requirements).
- 26 • A complete reference list including all mandatory and additional documentation.
- 27 • Additional relevant information for the required programmatic and waste stream data
28 addressed in the AK Summary, examples of which are presented in Permit Attachment
29 C4, Section C4-2c.
- 30 • Identification of any mandatory requirements supported only by upper tier documents
31 (i.e., there is insufficient supporting data).
- 32 • Description or other means of demonstrating that the AK process described in the
33 Permit was followed (for example, AK personnel were appropriately trained;
34 discrepancies were documented, etc).
- 35 • Information showing that the generator/storage site has developed a written procedure
36 for compiling the AK information and assigning hazardous waste numbers as required
37 in Permit Attachment C4-3b.

- Information showing that the generator/storage site has assessed the AK process (e.g. internal audits, Permit Attachment C4-3b).

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

C4-3e Requirements for Re-evaluating Acceptable Knowledge Information

Acceptable knowledge includes information regarding the physical form of the waste, the base materials composing the waste, and the process that generates the waste. Waste testing (i.e., radiography or visual examination) may be used to augment acceptable knowledge information.

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

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

- Review existing information based on the container identification number and document all differences in hazardous waste number assignments
- If differences exist in the hazardous waste numbers that were assigned, reassess and document all required acceptable knowledge information (Section C4-3b) associated with the new designation
- Reassess and document all testing data associated with the waste
- Verify and document that the reassigned Waste Matrix Code was generated within the specified time period, area and buildings, waste generating process, and that the process material inputs are consistent with the waste material parameters identified during radiography or visual examination
- Record all changes to acceptable knowledge records
- If discrepancies exist in the acceptable knowledge information for the 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

1 C4-3f Acceptable Knowledge Data Quality Requirements

2 The data quality objectives for testing techniques are provided in Permit Attachment C3. Testing
3 results will be used to augment the characterization of wastes based on acceptable knowledge.
4 To ensure that the acceptable knowledge process is consistently applied, the Permittees shall
5 require sites to comply with the data quality requirements for acceptable knowledge
6 documentation in Permit Attachment C3.

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

15 C4-3g Audits of Acceptable Knowledge

16 DOE will conduct an initial audit of each site prior to certifying the site for shipment of TRU
17 mixed waste to the WIPP facility. This initial audit will establish an approved baseline that will be
18 reassessed annually DOE. These audits will verify compliance with the requirements specified
19 in the WAP (Permit Attachment C). The audits will be used to verify compliance with the
20 compilation, application, and interpretation requirements of acceptable knowledge information
21 specified in this Permit at all sites, and to evaluate the completeness and defensibility of site-
22 specific acceptable knowledge documentation related to hazardous waste characterization.
23 Permit Attachment C6 gives a description of the overall audit program and a required checklist.
24 Figure C4-2 includes the primary steps associated with the audit process of acceptable
25 knowledge.

26 Site-specific audit plans will be prepared by DOE and provided to NMED, and will identify the
27 scope of the audit, requirements to be assessed, participating personnel, activities to be
28 audited, organizations to be notified, applicable documents, and schedule. Audits will be
29 performed in accordance with written procedures and site-specific checklists that will be
30 developed by DOE prior to the audit and provided to NMED. The site-specific audit checklists
31 will include items associated with the compilation and evaluation of the required acceptable
32 knowledge information as specified in the checklist required by Permit Attachment C6.

33 Audit checklists shall include Table C6-3 in Permit Attachment C6, and will include but not be
34 limited to the following elements for review during the audit:

- 35 • Documentation of the process used to compile, evaluate, and record acceptable
36 knowledge is available and implemented;
- 37 • Personnel qualifications and training are documented;
- 38 • All of the required acceptable knowledge documentation specified in Section C4-2 has
39 been compiled in an auditable record;

- 1 • All of the required procedures specified in C4-3 have been developed and
2 implemented, including but not limited to:
 - 3 – A procedure exists for assigning hazardous waste numbers to waste streams in
4 accordance with Section C4-3;
 - 5 – A procedure exists for resolving discrepancies in acceptable knowledge
6 documentation in accordance with Section C4-3; and
- 7 • Results of other audits of the TRU mixed waste characterization programs at the site
8 are available in site records.

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

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

23 Auditors will review the acceptable knowledge documentation for selected waste streams for
24 logic, completeness, and defensibility. The criteria that will be used by auditors to evaluate the
25 logic and defensibility of the acceptable knowledge documentation include completeness and
26 traceability of the information, consistency of application of information, clarity of presentation,
27 degree of compliance with this Permit Attachment with regard to acceptable knowledge data,
28 nonconformance procedures, and oversight procedures. Auditors will evaluate compliance with
29 written site procedures for developing the acceptable knowledge record. A completeness review
30 will evaluate the availability of all required TRU mixed waste management program information
31 and TRU mixed waste stream information (Section C4-2). Records will be reviewed for
32 correlation to specific waste streams and the basis for characterizing hazardous waste. Auditors
33 will verify that sites include all required information and assigned appropriate hazardous waste
34 numbers as indicated by the acceptable knowledge records and consistent with RCRA
35 requirements. All deficiencies in the acceptable knowledge documentation will be included in the
36 audit report.

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

1 After the audit is complete, DOE will provide the site with preliminary results at a close-out
2 meeting. DOE will prepare a final audit report that includes all observations and findings
3 identified during the audit. Sites shall respond to all audit findings and identify corrective actions.
4 Audit results will be included in the final audit report (Permit Attachment C6). If acceptable
5 knowledge procedures do not exist, the required information is not available, or corrective
6 actions (i.e., CARs) are identified associated with acceptable knowledge compilation, and/or
7 hazardous waste characterization, the Permittees will not manage, store, or dispose TRU mixed
8 waste for the subject waste summary category. Management, storage, or disposal of the subject
9 waste summary category at WIPP will not resume until DOE find that all corrective actions have
10 been implemented and the site complies with all applicable requirements of the WAP.

11 DOE disseminates information regarding TRU mixed waste characterization requirements and
12 program status through the WIPP Home Page. The Permittees will use this web page to
13 disseminate information regarding TRU mixed waste streams, RCRA compliance, and
14 operational and programmatic issues, methods development, and waste characterization
15 information, including the application of acceptable knowledge. DOE is provided the required
16 waste characterization information prior to management, storage, or disposal of that waste at
17 WIPP and also will conduct audits at least annually. The Permittees will maintain an operating
18 record for review during regulatory agency audits. NMED may also review any information
19 relevant to the scope of the audit during site audits. DOE will notify NMED regarding any site's
20 failure to implement corrective actions associated with hazardous waste characterization as
21 specified in Parts 1 and 2 and Permit Attachment C3.

22

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2

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1

FIGURES

2

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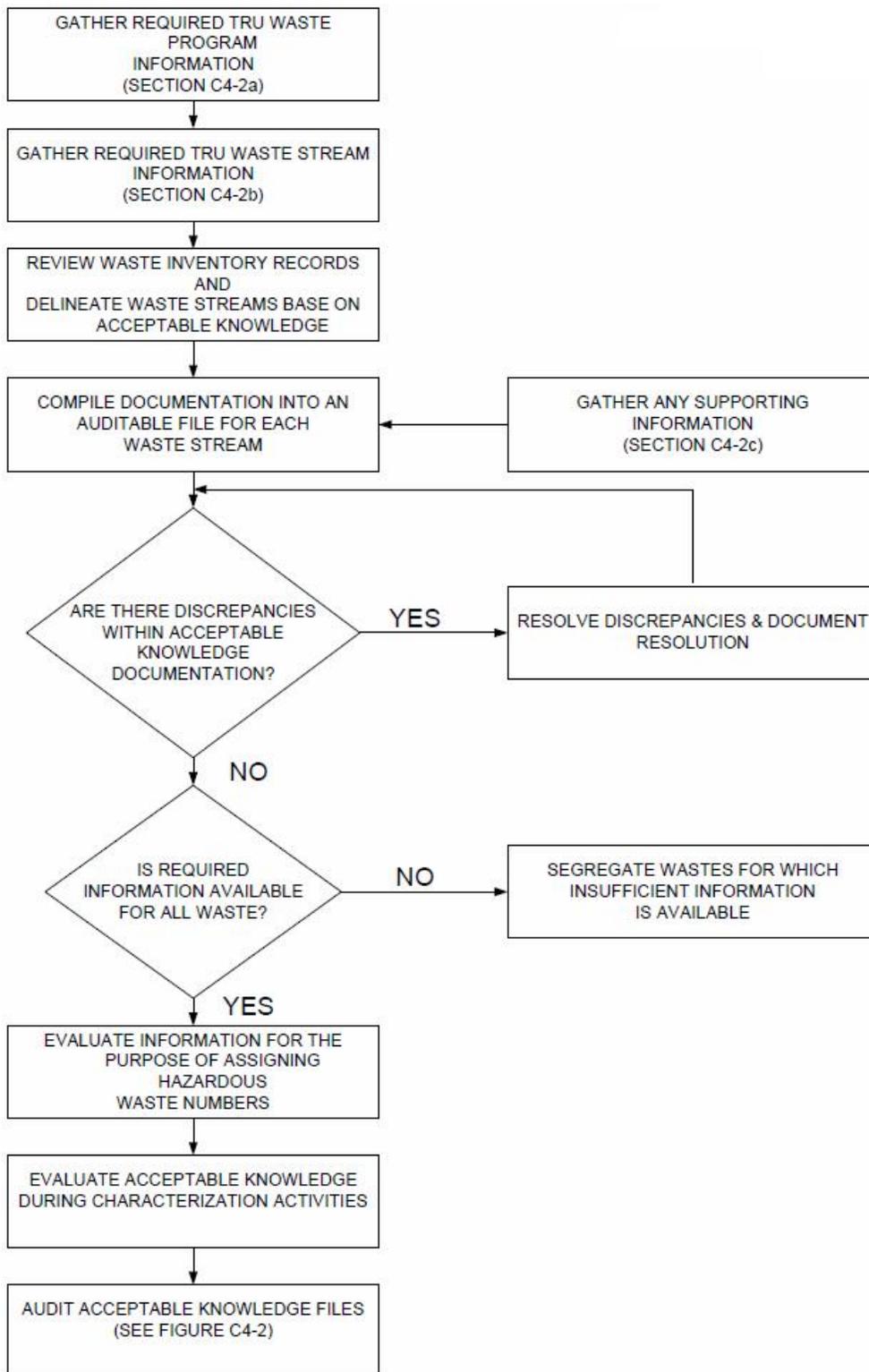
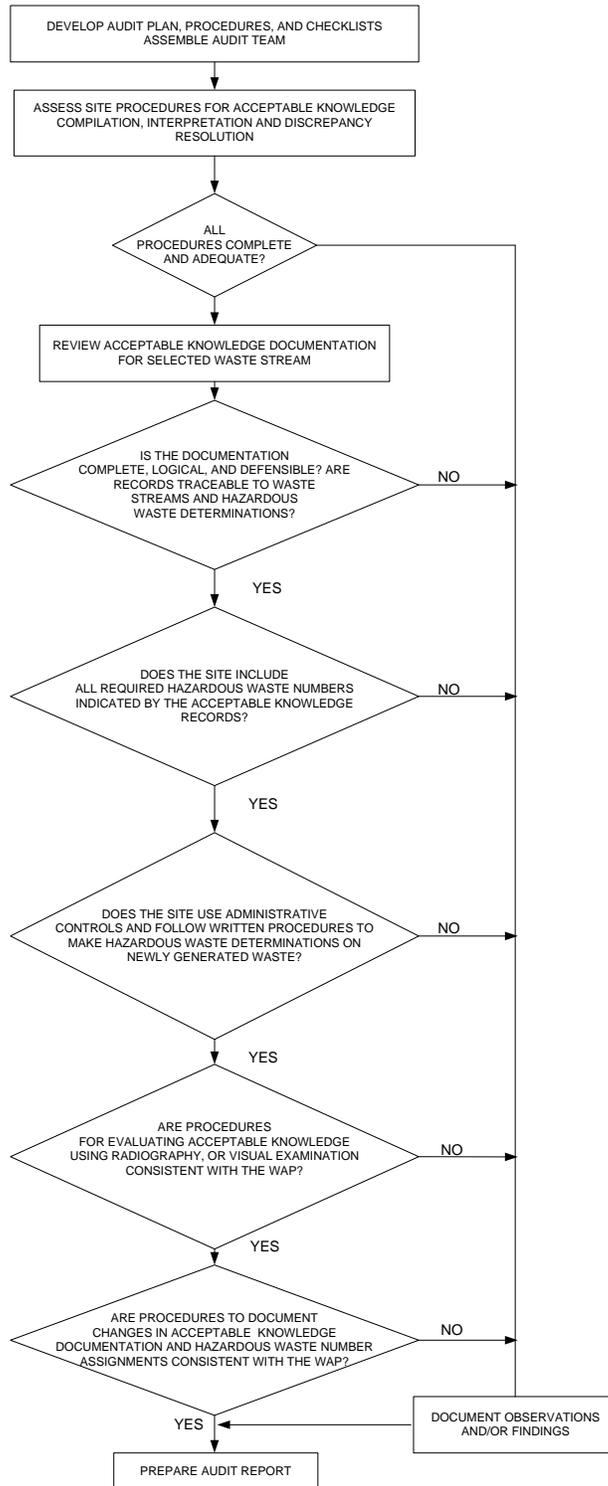


Figure C4-1
Compilation of Acceptable Knowledge Documentation



**Figure C4-2
 Acceptable Knowledge Auditing**