

**From:** Biswell, David, NMENV  
**Sent:** Monday, July 17, 2017 9:54 AM  
**To:** Allen, Pam, NMENV  
**Cc:** Maestas, Ricardo, NMENV  
**Subject:** FW: NMED Observation of the AK portion of WIPP LANL Re-certification Audit A-17-17 AK  
**Attachments:** AK WIPP Audit Observ NMED May 2017\_final.docx

WIPP June Correspondence

**From:** Maestas, Ricardo, NMENV  
**Sent:** Monday, June 19, 2017 1:14 PM  
**To:** Biswell, David, NMENV <David.Biswell@state.nm.us>  
**Subject:** FW: NMED Observation of the AK portion of WIPP LANL Re-certification Audit A-17-17 AK

FYI..

Maybe we can take a look at this when we get a chance.

**From:** Jana Dawson [<mailto:dawson.jana@gmail.com>]  
**Sent:** Monday, June 19, 2017 1:12 PM  
**To:** Maestas, Ricardo, NMENV <[Ricardo.Maestas@state.nm.us](mailto:Ricardo.Maestas@state.nm.us)>  
**Cc:** Kimberly Wood <[krw@trininc.com](mailto:krw@trininc.com)>; David Stuenkel <[dstuenkel@trininc.com](mailto:dstuenkel@trininc.com)>  
**Subject:** NMED Observation of the AK portion of WIPP LANL Re-certification Audit A-17-17 AK

Ricardo,

Please see attached, the report for NMED's observation of the Acceptable Knowledge (AK) portion of the WIPP Re-certification Audit A-17-17 at the Los Alamos National Laboratory May 16-19, 2017.

Please let David Stuenkel and I know if you have questions or need anything else.

We appreciate the opportunity to assist NMED with the WIPP project.

Thank you,

Jana Dawson  
Trinity Engineering Assoc.  
703-627-0821



**Audit Observation  
Acceptable Knowledge**

**Central Characterization Program (CCP)  
Waste Isolation Pilot Plant (WIPP)  
Re-Certification Audit A-17-17**

**May 16-19, 2017**

Prepared for:

New Mexico Environment Department  
Hazardous Waste Bureau  
2905 Rodeo Park Drive East  
Building I  
Santa Fe, New Mexico 87505-6303

Prepared by:

Trinity Engineering Associates  
25 W. Fountain Ave.  
Cincinnati, Ohio 45246

June 2017

## **Contents**

I. Purpose .....	1
II. Background .....	1
III. Audit Documents .....	2
IV. General AK Audit Observations and Discussions .....	6
V. Audit A-17-17 Acceptable Knowledge Findings .....	8

## **Appendices**

Appendix A - CCP-TP-005 Implementation.....	9
Appendix B - Chapter 18 of the WIPP Documented Safety Analysis (DSA) and DOE Accident Board Findings.....	18

## **List of Figures**

Figure 1: CCP-TP-005 AK Data Compilation.....	10
Figure 2: Relationship of AK Data and CCP AK Reports. Items in blue are new Enhanced AK documents. ....	14

## **List of Tables**

Table 1: Information Included in AK Summary and New Enhanced AK Reports	12
---	----

## I. Purpose

This report documents the New Mexico Environment Department observation of the Acceptable Knowledge portion of the **Waste Isolation Pilot Plant (WIPP) A-17-17 LANL/CCP Recertification Audit** conducted at the Los Alamos National Laboratory (LANL) on May 16-18, 2017. The scope of AK portion of the audit was to evaluate the adequacy, implementation, and effectiveness of technical and related quality assurance (QA) processes for AK characterization of TRU waste containing remediated nitrate salts at the LANL. Specifically, the AK audit focused on Waste Campaign (WC) 304 consisting of sixty (60) remediated nitrate salt (RNS) containers currently stored at Technical Area (TA) 54, Area G, Dome 375 perma-Con, as well as over one hundred containers at the Waste Control Specialists (WCS) facility in Texas. These containers require treatment to render each the waste stable by removing the hazardous waste characteristics of ignitability and corrosivity, in accordance with the WIPP Waste Acceptance Criteria. Waste streams examined included the LA-CIN01.001, LA-MHD01.001, and LA-MSG04.001, LA-MIN02-V.001, LA-MIN04-S.001.

The DOE Carlsbad Field Office (CBFO) team lead for the AK portion of this audit was Mr. Dick Blauvelt. The NMED observers were Mr. Ricardo Maestros and Ms. Jana Dawson, NMED support contractor, Trinity Engineering Associates.

## II. Background

The WIPP is operated in accordance with the Resource Conservation and Recovery Act (RCRA) regulations/WIPP RCRA Permit issued under the authority of the Secretary of the New Mexico Environment Department (Secretary) in accordance with the New Mexico Hazardous Waste Act (HWA), NMSA 1978, §§74-4-1 through 74-4-14 and the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 NMAC. The WIPP RCRA Permit contains terms and conditions that the Secretary determined are necessary to protect human health and the environment, pursuant to 20.4.1.900 NMAC (incorporating 40 CFR §270.32(b)(2)).

Details pertaining to the requirements for identification and characterization of transuranic (TRU) waste, and TRU-mixed waste streams, i.e., TRU waste containing RCRA hazardous substances or which are RCRA hazardous due to a toxicity characteristic, as promulgated in 20.4.1.500 NMAC (incorporating 40 CFR §264.13(a)) [TRU-mixed waste] are found in the WIPP RCRA Permit Waste Analysis Plan (WAP) and Attachment C. The DOE's Central Characterization Program (CCP) is responsible for the identification, characterization, and certification of all TRU/TRU-mixed waste streams destined for disposal at WIPP in accordance with all applicable federal and state regulations, and the WIPP Permit. As defined in the WIPP RCRA Permit WAP, identification and characterization of TRU waste streams is accomplished by compiling information documenting the physical, chemical, and radiological components of the waste. The documentation that includes this information is considered the basis for the Acceptable Knowledge (AK) which is used to characterize the waste. In accordance with the WIPP Permit WAP, the AK characterization information is confirmed with radiography, visual examination (VE), non-destructive assay, and/or waste container sampling and analysis information is used to certify TRU waste for acceptance and disposal at the WIPP. Characterization of TRU waste is governed by the Nuclear Waste Partnership, LLC (NWP)

Quality Assurance Program Description (QAPD) and the CCP Quality Assurance Project Plan (QAPjP), CCP-PPO-021, Revision 21, April 17, 2013. The QAPjP describes how waste characterization and certification by the CCP complies with NM 4890139088-TSDF, Waste Isolation Pilot Plant Hazardous Waste Facility Permit (HWFP), Attachment C - C6, Waste Analysis Plan (WAP) (New Mexico Environment Department [NMED]) and the NWP QAPD.

AK is used in TRU/TRU-mixed waste characterization activities in five ways:

- To delineate TRU waste streams
- To assess whether TRU waste streams are also considered RCRA hazardous waste because the waste exhibits a hazardous characteristic (20.4.1.200 5 NMAC, incorporating 40 CFR §261 Subpart C) [TRU-mixed waste]
- To assess whether TRU wastes are RCRA hazardous due to the presence of listed chemicals (20.4.1.200 NMAC, incorporating 40 CFR §261 Subpart D) [TRU-mixed waste]
- To assess whether TRU/TRU-mixed wastes comply with the TSDF-WAC 4
- To estimate waste material parameter weights

### III. Audit Documents

The following is a list of select procedures, AK Summaries, AK Documents, and other AK Reports that were among those provided for review. The list is representative of those documents and procedures related to AK of waste streams LA-MHD01.001, LA-CIN01.001, LA-MIN02-V.001, LA-MIN04-S.001 that were most frequently examined during the audit:

- CCP-TP-005, Revision 29, November 17, 2016, Central Characterization Project (CCP) Acceptable Knowledge (AK) Documentation.
- CCP-TP-005, Revision 29, November 17, 2016, Central Characterization Project (CCP) Acceptable Knowledge (AK) Documentation, Attachment 3, Acceptable Knowledge Source Document Summary – Acceptable Knowledge Assessments (AKA) for:
  - AKA01: 80 Containers of LA-MHD01.001 stored at Waste Control Specialists, TX, 01/15/17
  - AKA02: 86 Containers of LA-CIN01.001 stored at WCS, 01/25/17
  - AKA05: Waste Container for LA-MSG04.001 stored at WCS, 03/01/17
- CCP-TP-005, Rev. 29, Central Characterization Project (CCP) Acceptable Knowledge (AK) Documentation, Attachment 9, Interface Waste Management Document Lists: Waste Stream LA-MHD01.001 (TA-55 Mixed Heterogeneous Debris) 04/26/17 and Waste Stream LA-CIN01.001 (TA-55 Cemented TRU Waste) 01/18/17
- CCP-AK-LANL-006, Revision 13, February 10, 2014: Central Characterization Program, Acceptable Knowledge Summary Report for Los Alamos National Laboratory TA-55 Mixed Transuranic Waste Streams: LA-MHD01.001, LA-CIN01.001, LA-MIN02-V.001, LA-MIN04-S.001
- LANL AK Tracking Spreadsheet, 4/11/17 Excel Spreadsheet file LANL\_AK-Tracking-Spreadsheet\_4-11-2017\_12\_51\_44\_PM.xlsx

### Example/Traceability Evaluation for Waste Stream LA-MHD01.001

- AKA01: Acceptable Knowledge Assessment of Containers from Acceptable Knowledge Summary Report CCP-AK-LANL-006 Waste Stream LA-MHD01.001. AKA01, M. Papp, Rev. NA. January 15, 2017, AK-TA55-827
- Memorandum from Michael Papp, AK Expert to CCP Central Records dated January 5, 2017 Regarding Acceptable Knowledge Assessment of Containers from AK summary Report CCP-AK-LANL-006 Waste Stream LA-MHD01.001 RE: population of 80 waste containers from Waste Stream LA-MHD01.001 currently stored at the Waste Control Specialists (WCS) Treatment, Storage, and Disposal Facility in Texas.
- CCP-AK-LANL-010, Revision 6, February 14, 2013: Central Characterization Program, Acceptable Knowledge Summary Report for Los Alamos National Laboratory TA-21 DP West Facility, Waste Streams: LA-MHD04.001, LA-MSMSG01.001
- AK checklist, AKA MHD01.001-003, 04/25/17.
- AK-LANL-00012, WC304, Revision 0, November 14, 2016: Treatment of RNS Waste Containers at LANL
- AK-LANL-00025, Waste Campaign Plan WC304, WC304, Revision 1, January 12, 2017, Treatment of RNS Waste Containers at LANL
- AK-LANL-00071, Waste Campaign Plan 304, WC304, Revision 2, April 5, 2017, Treatment of RNS Waste Containers at LANL
- AK-LANL-00092, Waste Campaign Plan 304, WC304, Revision 3, April 19, 2017, Treatment of RNS Waste Containers at LANL
- AK-LANL-00094, Waste Campaign Plan 304, WC304, Revision 4, May 1, 2017, Treatment of RNS Waste Containers at LANL
- CCP Standing Order CCP-SO-LANL-70, Revision 0, February 25, 2015, LANL VE Documentation Collection for Liquids and Absorbed Liquids

### Example Documents for Waste Stream LA-CIN01.001

- Los Alamos Radioactive Solid Waste Disposal Record Form S822683, 01/22/82.
- CCP-TA-053 Attachment 2, CCP Radiography Data Sheet, Waste Container 67336, 08/15/13.
- TRU Waste Storage Record (TWSR) for Waste Profile Number 34161 (WS ID 576) [includes waste container 67336], 04/16/13.
- Waste Profile Form (WPF), Legacy Profile Form ID 34161, Waste Stream ID 576, 08/31/01.
- Attachment 1, WCRRF Waste Characterization Glovebox Operations, EP-WCRR-WO-DOP-0233, Revision 37, 3/20/13: Waste Stream LA-CIN01.001, parent waste container S822683 [Repackaging of parent waste container S822683 to into daughter waste container 93967 on 07/08/13]

- CCP-TA-053 Attachment 2, CCP Radiography Data Sheet, Waste Container 93967, 12/12/13
- Tru Waste Storage Record (TWSR) for Waste Profile Number 32358 (WS ID 13944), Waste Container 93967, 07/08/13.
- Waste Profile Form (WPF), Legacy Profile Form ID 32358, Waste Stream ID 13944, 3/20/00.
- CCP-TP-005, Revision 29, November 17, 2016, Central Characterization Project (CCP) Acceptable Knowledge (AK) Documentation, Attachment 13, CCP Waste Stream Characterization Checklist, Waste Stream number LA-CIN01.001 Homogeneous Solids/Solidified Inorganics, 08/12/13.

#### Traceability Evaluation for Drums

The following documents were evaluated for (1) Drums 54045, 54263, and 69550 in Waste Stream LA-CIN01.001; (2) Drums 65586, 67772 in Waste Stream LA-MHD01.001; (3) Drums 66126, 66127 in Waste Stream LA-MSG04.001; and (4) Drum SB10201 in Waste Stream LA-MIN04.02:

- CCP-TP-001, Revision 21, 06/06/13, CCP Project Level Data Validation and Verification, Attachment 3 – CCP SPM Nondestructive Assay Project level Validation Checklist and Summary
- Container ID Screenshots with AK, BDR, NCR, and Reject data for each container
- CCP-TP-001, Revision 21, 06/06/13, CCP Project Level Data Validation and Verification, Attachment 2 – CCP SPM Radiography Project Level Validation Checklist and Summary

#### TRU Waste Storage Records

- CCP-TP-005, Revision 28, February 29, 2016, Central Characterization Project (CCP) Acceptable Knowledge (AK) Documentation, Attachment 3, Acceptable Knowledge Source Document Summary
- CCP-TR-120, Revision 16, 06/18/13, CCP Container Management, Attachment 2 – Container Inspection Report

#### Absorbent Material Data Safety Sheets

- M154 – Material Data Safety Sheet: Warren “Kitty, Kitty” Litter, Warren Oil Company, 01/20/98
- M154 Addendum 1 – Material Data Safety Sheet: N935 OL’BOND TRADE SECRET, Nochar, Inc., 02/23/06
- M154 Addendum 4 – Material Data Safety Sheets: N910 Nochar’s Trade Secret; Waste Lock 770 – 01/2/14; TotalSorb Plus – 4/26/15; KMI Zeolite, Potassium Sodium Magnesium Calcium Aluminosilicate Mineral – 05/05/11.

Other AK Documents

- P099, Addendum 4: NPI-17 Packing TRU Waste into Approved Containers, Document Number PA-DOP-01456, R4, AK-TA55-875, 04/20/17.
- P099 Attachment 3, Acceptable Knowledge Source Document Summary, packing TRU Waste into Approved containers, 11/17/16.
- P334 Attachment 3, Acceptable Knowledge Source Document Summary, Use of commercially available solidification agents for the immobilization of non-hazardous and hazardous liquid waste materials in PF-4 gloveboxes, and fact sheets for two solidification products currently approved for use at TA-55, 11/16/17.
- Nuclear Waste Partnership Quality Assurance Audit Report, Central Characterization Program, Quality Assurance Program, Audit I17-01, October 3-6, 2016.
- DOE Waste Isolation Pilot Plan Documented Safety Analysis, Revision 5, April 2016, Nuclear Waste Partnership LLC, Carlsbad, NM.

The following is a list of some of the BDRS provided to the audit team for review:

<b>Assay/Examination Type</b>	<b>BDR Number</b>
Flame Gas Analysis (FGA)	LA16FG12002 LA17FG2002 LA17FG2002 LA17FG12002
Non-Destructive Analysis (NDA)	2LANDA1292 2LANDA1293 2LANDA0290 2LANDA0085 2LANDA0086
Non-Destructive Examination (NDE) Real Time Radiography (RTR)	LA -HERTR-14-0051 LA-HERTR-17-0001 LA-HERTR-17-0002 LA-HERTR-17-0003
Visual Examination (VE)	LAVE-030002 LAVE-030003 LAVE-030004 LAVE-030005 LAVE-030006

The following Central Characterization Program (CCP) procedure CCP-QP-005, Revision 22, CCP TRU Nonconforming Item Reporting and Control Reports, 09/27/12 [NCRs] were provided for review:



<b>NCR Number</b>	<b>Subject</b>	<b>Date</b>
NCR-LANL-0316-12	RTR	12/03/12
NCR-LANL-0617-12	Prohibited Item	07/25/12
NCR-LANL-0701-12	Prohibited Item	04/12/12
NCR-LANL-0704-12	RTR	01/19/12
NCR-LANL-0973-12	Prohibited Item	06/12/12
NCR-LANL-0983-12	Prohibited Item	06/12/12
NCR-LANL-1875-12	Prohibited Liquid	10/05/12

#### IV. General AK Audit Observations and Discussions

Based on observations made by the audit team during review of the AK documentation, the audit team lead, Mr. Blauvelt told NWP/LANL personnel that all pertinent AK/waste packaging procedures need to include a reference to the applicable Material Data Safety Sheets (MSDSs) for absorbents used in the waste containers. Additionally, Mr. Blauvelt stated that NWP personnel at LANL need to make sure MSDS's are available to waste repackaging operators.

##### Discrepancy Reports

If the Visual Examination (VE) staff has a question about the waste, they should contact the VE Manager (VPM) or cognizant engineer.

##### TWSRs

TRU waste streams are currently identified by a Waste Stream Identification number, whereas the previous numbering system used the term 'TRU Waste Storage Record Number or TWSR' to identify waste streams. For instance, Waste Stream ID 23358 was formerly labeled with a TRU Waste Storage Record Number of 50392. The Waste Stream ID documentation identifies the type of waste (i.e., soil and plastic sheeting), where the TWSR did not provide this level of detail.

For Batch Data Report (BDR) SB10201, 42134 which has LA-CIN01.001 containers, the Waste Stream ID matches Waste ID on TWSR. The Procedure P333 Revision 1 documents that during waste stream identification, the generator is required to provide estimated volumes. The CCP staff is also going to verify that Procedure M154 contains all the NOSHAR (packaging materials) Material Safety Data Sheets.

The audit team asked NWP/LANL if an NCR would be generated for RTR BDR SB10201, 42134 if the VE operator identifies observable liquid but not prohibited liquid. It was stated that the presence of less than one percent (1%) liquid is acceptable. LANL specifies how much free liquid you can have in a container. The CCP staff said drum was compliant, but LANL set it aside. This drum is currently on hold at LANL.

For waste streams generated in TA-55, even if LANL knows the waste stream is homogenous, it will be characterized as debris because of the way it is packaged. The Waste Stream Profile Form identifies the waste as homogenous (S3000), but lists soil, wood, and plastic. LANL

generates a memo documenting this waste as debris, and adding it to the MDH01.001 waste stream. If a waste stream is made up of salts, it will be identified as part of the LA-MIN04-001 waste stream. It is noted that LANL does not have an oxide or ash waste form.

#### Waste Container Evaluation and Addition to the Tracking Sheet

A discussion was held regarding how waste containers are added to the container tracking spreadsheet. CCP staff stated they would look at all the original paperwork for the container and list anything this paperwork identified. For example, CCP will get information on a group of drums needing to be added to the spreadsheet, including the waste profile form, information from the WCATS database, and all records from the generator (such as VE and RTR batch data reports). LANL staff stated that containers are not added to the AK tracking spreadsheet until all this information is collected from LANL. If the container consisted of plastic, rubber, wood, or rags, it was re-packaged. Additionally, information which explained how the waste was repackaged was reviewed. If the waste had not been repackaged, staff would look at the characterization information and paperwork specific to the TA-55 waste handling building. If a waste container showed rags, it was repackaged without rags, and if RTR confirmed there were no rags, a Basis of Knowledge (BOK) review/exercise was conducted to confirm that the container no longer had any rags. The BOK review does not consider requirements related to RCRA. Once it is determined that a container can be added to the AK tracking spreadsheet, an 'Add Container Memo' is generated and submitted.

Audit staff discussed the fact that a procedure was needed to document how the BOK review is conducted and who has the authority to provide approval based on the BOK review.

For the LA-MHD01.001 and LA-CIN01.001 waste streams, the source documents that supported the Acceptable Knowledge Assessment (AKA) included all documents listed in the tracking spreadsheet.

Of the initial 90 waste containers evaluated, only eight containers from WCS in Texas, and eight containers from the Waste Handling Building (16 total) have been certified and approved for shipment to WIPP in Revision 1 of the BOK Memo from Mr. Mike Ramirez.

The BOK Committee's charter is to determine if containers meet certain criteria, or that if the waste could not meet the criteria, they could verify the waste meets the intent of the BOK. For example, some waste containers had rags, but were found to be associated with Fantastic bottles (not nitric acid).

Once the BOK evaluation is completed, a recommendation is made to the BOK board. BOK board members vote. The vote is weighted, and if the head of the board says the waste can go forward, the waste will go forward.

CCP staff stated that Waste Stream Profile Forms (WSPF) will be updated with the most recent versions of all applicable procedures, and any outdated TRU Waste Codes will be removed. For WSPFs, updates can be made by attaching relevant sections from AK Report and/or attaching change notices.

For Waste Streams S3000, S4000, S5000, CCP staff stated that not all the enhanced AK documents are complete. For those waste forms which are not yet updated, the AK report is given an 'indeterminate' status for reporting to CBFO for these waste streams. Once a waste stream is moved off the approved list, it cannot be moved back to certified status until the entire

waste stream is approved. It was also noted that putting a hold on containers in the container tracking spreadsheet prevents containers from shipping.

## V. Audit A-17-17 Acceptable Knowledge Findings

No items of concern or findings were noted during the AK portion of the audit.

## Appendix A - CCP-TP-005 Implementation

CCP's primary Acceptable Knowledge Procedure is CCP-TP-005. Revisions 27 and 28 included a new, "enhanced" AK process. Revision 29 incorporated lessons learned after implementation of the enhanced AK requirements and incorporated Standing Order CCP-SO-119, Revision 0. In addition, Revision 29 implemented a container review for the requirements of the basis of knowledge document.

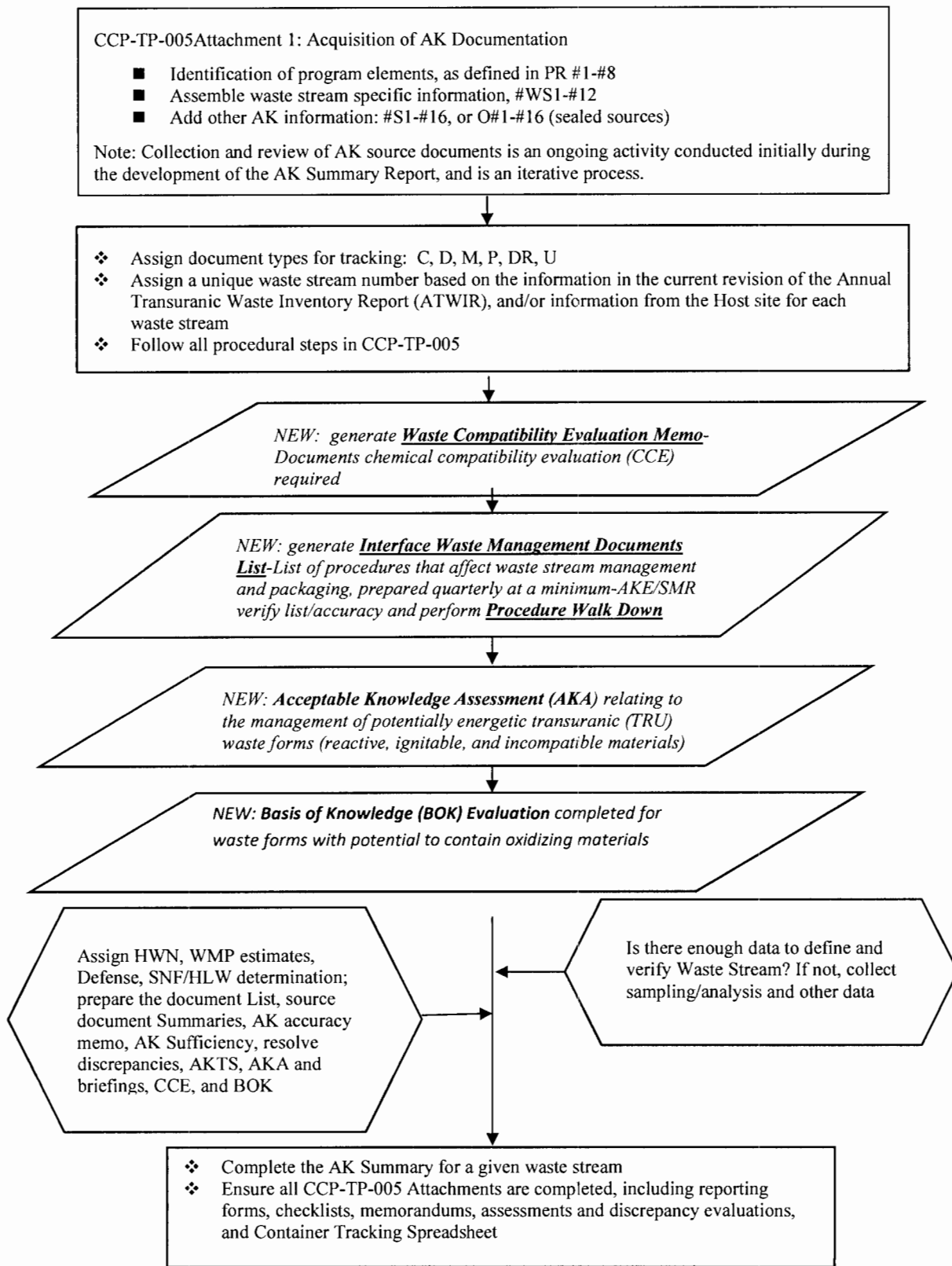
The following summarizes the AK Process as presented in CCP-TP 005 and identifies "enhanced" elements new to the Acceptable Knowledge process. This procedure applies both to contact handled (CH) and remote handled (RH) TRU waste.

AK compilation is the first step in the acceptable knowledge process, and involves the collection of AK information and assembly of the "waste stream". A waste stream is defined in Attachment C as: "waste materials that have common physical form, that contain similar hazardous constituents, and that are generated from a single process or activity". Figure 1 summarizes the acceptable knowledge compilation process.

Following compilation, documents are formally assigned a source document identifier based on the "type" of document it is, which include Acceptable Knowledge Assessment (AKA), Chemical Compatibility Evaluation (CCE), Correspondence (C), Documents (D), Miscellaneous (M), Procedure (P), Discrepancy Resolution (DR), Unpublished Documents (U). An AK Source Document Summary (CCP TP 005 Attachment 3) is prepared that summarizes relevant document contents and documents data limitations and other items. Also, the Acceptable Knowledge Information List (CCP-TP-005 Attachment 4) is prepared which is basically a reference list that includes ALL sources documents for a waste stream, not just those added at the end of an AK Summary. Attachment 4 includes the following:

- Site, waste stream number, and waste stream description
- Source document tracking number
- Source document title or description
- Name of author
- Original document number, or publisher's document number (if available)
- Revision number and document date (if applicable)

The AK Tracking Spreadsheet (AKTSS, also known as the Acceptable Knowledge Container Tracking Spreadsheet) is initiated, which tracks drums status for every drum in waste streams with respect to vent date, certification status, etc. The AKTSS basically tracks the status of all drums at a site and is kept current so that at any point in time drums in a given waste stream can be identified and their status ascertained.



**Figure 1: CCP-TP-005 AK Data Compilation**

Data are then reviewed and examined, and preparation of the AK Summary is initiated. The AK Summary is the primary written document that assembles required information (presented in Attachment C4 of the permit) for each waste stream. Attachment 12 of CCP-TP-005 is an example form and content guide for AK Summaries. CCP-TP-005 includes AK-related permit requirements, as well as EPA requirements and requirements from the Waste Acceptance Criteria (WAC), and specifies that the AK Summary must include the information presented in Table 1, below. Note that this table is meant to present examples of data found in the CCP AK Summary Report; refer to WAP Attachment C4 and CCP-TP-005 for additional details.

The CCP-TP-005 procedure provides a comprehensive set of instructions for Central Characterization Program (CCP) personnel responsible for assembling, evaluating, documenting, and verifying acceptable knowledge (AK) characterization information for transuranic (TRU) waste streams that may be eligible to be disposed of at the Waste Isolation Pilot Plant (WIPP). Verification of AK documentation includes an audit process whereby each generator site's documentation and processes are reviewed to determine the AK accuracy; sufficiency; adherence with procedures CCP-PO-001, CCP-PO-002, CCP-PO-003, CCP-PO-050, CCP-PO-401, and CCP-PO-505; and identification and resolution of any noted discrepancies in AK documentation. The procedure includes instructions for ensuring compliance with the AK waste characterization requirements specified in the WIPP RCRA Waste Disposal Permit.

AK includes any documentation that describes or verifies site history, mission, and operations, in addition to waste stream-specific information used to define the generating process, waste matrix, waste quantities, and contaminants (radiological and chemical). The information required in the performance of this procedure is used to prepare an AK Summary Report or an AK Sufficiency Determination.

Figure 2 presents the types of information reviewed, evaluated, and included in the AK Summary and some of the associated CCP forms and documents that are also produced as part of the AK Summary Document preparation process. The intent of this figure is to show how necessary information is presented in attachments and documents, and how the information is interrelated. Note that the AK process also includes the AK Sufficiency Determination.

**Table 1: Information Included in AK Summary and New Enhanced AK Reports**

<p align="center"><b>General Information Required in AK Summary and CCP- TP-005, Revision 29, November 17, 2016 and Associated Attachments or Documents</b></p>
<p>CCP-TP-005 Rev. 29 and the AK Summary Report incorporate lessons learned after implementation of the enhanced AK requirements from Standing Order CCP-SO-119, Revision 0, established after the WIPP 2014 Radiological Release events.</p>
<p>Justification of High Level Waste and Spent Nuclear Fuel (HLW/SNF) exclusion and Defense Determination</p>
<p>A TRU Waste Management Program Description that addresses:</p> <ul style="list-style-type: none"> <li>• All documents in CCP-TP-005 Attachment 1</li> <li>• List for current waste management procedures at generator sites, Attachment 9</li> <li>• Ensures specific document contents and comparisons are included</li> <li>• Correlates TRU waste management program information (AK #s PR1 - PR8) and TRU waste stream-specific information (AK #s WS1 - WS12) with regard to the time of generation, waste generation processes, rate and quantity of newly generated waste (when appropriate), and areas and building or facility where the waste stream was generated, as specified in Permit Attachment C4.</li> </ul>
<p>Assignment of waste matrix codes, waste material parameters, waste matrix code groups, summary category groups, and identification of other physical parameters, as well as layers of confinement and exclusion of prohibited items; this is also documented on Attachment 6 of CCP-TP-005.</p>
<p>Identification of chemical contents and assignment of hazardous waste numbers (HWN) and completion of CCP-TP-005 Attachment 5.</p>
<p>Radionuclide content of waste and other related information including two most prevalent radionuclides, isotopic distribution of EPA's 10 required radionuclides, and preparation of CCP-TP-005, Attachment 7 with the AK-NDA memo attached that describes the review and concurrence of both the Acceptable Knowledge Expert (AKE) and NDA subject matter experts (SMEs).</p>
<p>To ensure that the AK documentation relating to the management of potentially reactive, corrosive, ignitable, and incompatible TRU waste materials is adequate, current, and accurately described in existing AK Summary Reports, an AK Assessment will be performed for existing AK Summary Report waste streams (or waste stream subpopulations) with unshipped containers.</p>
<p>Identification of waste containers and waste stream volume, including container types and future projections. CCP-TP-005, Attachment 8, is a Waste Containers List (or an equivalent form, e.g., spreadsheet) for the containers determined to be bounded by the Hazardous Constituents, Waste Form, Waste Material Parameters, Prohibited Items, and Packaging, and Radionuclide forms. Attachment 8 is typically updated using "add container" memos which add/remove containers from the tracking spreadsheet from the original containers included in the waste stream.</p>
<p>Annual Transuranic Waste Inventory Report (ATWIR) waste stream number.</p>
<p>Payload management information for those waste streams intended to be so managed (i.e., payload would include drums both above and below 100 nanocuries per gram (nCi/g) in accordance with CCP-PO-002, so long as the payload as a whole measured greater than 100 nCi/g).</p>
<p>Justification for determining that prohibited items are not present in the waste stream or describe the potential prohibited items and how they will be identified and remediated and identification of process controls associated with the management of prohibited items, physical form, and hazardous waste content.</p>
<p>Determination of whether any waste in the waste stream contains polychlorinated biphenyls (PCBs) in concentrations equal to or greater than 50 parts per million (ppm).</p>

**General Information Required in AK Summary and CCP- TP-005, Revision 29, November 17, 2016  
and Associated Attachments or Documents**

As applicable, information to support correlating or surrogate information from similar materials or waste streams generated at the same site or other sites used to support the characterization of an RH waste stream, as documented in CCP-TP-005, Attachment 15. Note: RH waste streams are currently not being accepted at WIPP.

A requirement to conduct a Basis of Knowledge (BOK) Evaluation of the Acceptable Knowledge Summary Report for waste that may contain oxidizing material. (Note: incorporated in Rev. 29).

List of Checklists and Records

Attachment 1 – Acceptable Knowledge Documentation Checklist

Attachment 2 – Records of Communication

Attachment 3 – Acceptable Knowledge Source Document Summary

Attachment 4 – Acceptable Knowledge Information List

Attachment 5 – Hazardous Constituents List

Attachment 6 – Waste Form, Waste Material parameters, Prohibited Items, and Packaging Form

Attachment 7 – Radionuclides Form

Attachment 8 – Waste Containers List

Attachment 9 - Interface Waste Management Documents List for currently generated waste/current waste management procedures; AKE/SMR Verification required with procedure walkdown

Attachment 10 – Acceptable Knowledge Re-evaluation Checklist

Attachment 11 – Acceptable Knowledge Source Document Discrepancy Resolution

Attachment 12 – Acceptable Knowledge Summary Report Form for currently generated waste

Attachment 13 – CCP Waste Stream Characterization Checklist

Attachment 14 – Acceptable Knowledge Accuracy Report

Attachment 15 – CCP TRU Waste Correlation and Surrogate Summary Form

Attachment 16 – Chemical Compatibility Evaluation Form and Content Guide



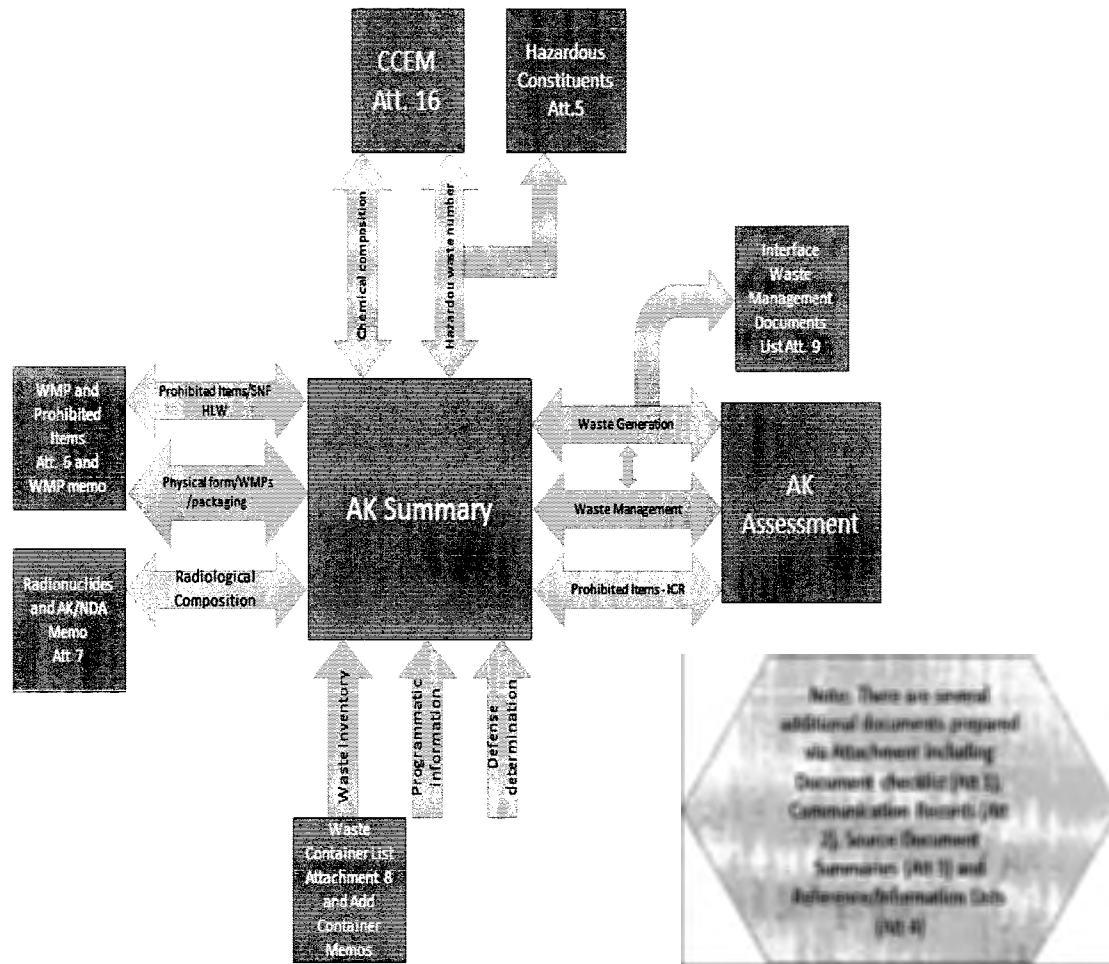


Figure 2: Relationship of AK Data and CCP AK Reports. Items in blue are new Enhanced AK documents.

As shown in Table 1 and Figure 1, there are four new documentation/review requirements associated with AK that are part of the new enhanced AK process. These are:

- Interface Waste Management Documents List (IWMDL): This list, created first by the CCP AK expert but verified and checked for relevance and procedural revision by the site representative, is a list of current generator-site procedures that affect waste stream management and packaging. The list is updated at least quarterly when the site representative verifies relevance/new procedures, or more frequently. The AKE maintains the list, which is presented in Attachment 9 of CCP TP 005. The AKE also has the responsibility to “walk down” the procedure, (i.e. work with the site to understand implementation of the procedure with respect to the effect the procedure has on waste composition, compatibility, etc.) Every waste that is actively being characterized (i.e. newly generated or repackaged) will have an associated IWMDL that documents *ongoing* waste packaging/management activities performed by the generator site. In short, the intent of this list is to document what is currently being done to waste at generator sites prior to CCP acceptance of that waste into a waste stream.
- Acceptable Knowledge Assessment (AKA): The Acceptable Knowledge Assessment is a report that is prepared, based on AK, to “ensure that the AK documentation relating to the management of potentially reactive, corrosive, ignitable, and incompatible TRU waste materials is adequate, current, and accurately described in existing AK Summary Reports”. For existing waste streams or waste stream subpopulations with unshipped containers, this one-time report will be prepared although NEW waste streams may not prepare an AKA but instead incorporate all of the following requirements into the AK Summary:
  - Waste stream summary (brief description of the waste stream and generating activities)
  - Historic waste management practices
  - Current waste management practices
  - Waste remediation and repackaging practices
  - Absorbent, immobilization, and neutralization reagents
  - Container specific documentation collected and reviewed
  - New and revised AK source documents
  - AKA conclusions, assumptions, and limitations, and
  - List of containers bounded by the evaluation

In short, the AKA is intended to document historical procedures that may have impacted waste management and affected waste currently certified and awaiting shipment as well as, for example, stored waste that may have undergone waste management procedures in the past.

- Chemical Compatibility Evaluation Memorandum: This memo is prepared for every waste stream (new and existing) except for those that have been completely disposed of in the subsurface at WIPP. The memo is intended to evaluate the potential for “adverse chemical reactions (e.g., generation of fire, explosion, heat, or fumes) that stem from combining chemicals”. To accomplish this and to expand on the evaluations already

done as part of AK and the AKA, a chemical compatibility evaluation will be performed based on the method described in the 1980 EPA method EPA-600/2-80-076, "*A Method for Determining the Compatibility of Hazardous Wastes*" (EPA Method). CCP-TP-005 Attachment 16, provides a template for the preparation of a CCEM.

- Basis of Knowledge (BOK) Evaluation: This evaluation requires the review of the Acceptable Knowledge Summary Report to determine the potential for the final waste form to have oxidizing properties, as defined in the BOK document. If the waste form as the potential to have oxidizing properties, then an evaluation to determine if the containers meet the requirements established in the BOK. The results of such an evaluation are documented in a memorandum.

AK data/results are also continually checked and updated by CCP. These documents include but are not limited to:

- Waste Stream Characterization Checklists (CCP-TP-005 Attachment 13) are used to compare the testing results from VE and Radiography, and NDA characterization activities to the waste stream AK. If inconsistencies are noted, the AK is re-evaluated (Attachment 10) and changes are made to the AK documentation if applicable.
- Discrepancy Resolutions (DRs) are issued when there is discrepant AK-AK information. Also, AK discrepancies may be identified during AK source document compilation, review, characterization, confirmation, AKA, CCEM, and re-evaluation activities. DRs are resolved by the AKE. If discrepancies cannot be resolved by CCP, the container(s) in question will be returned to the host site.
- The AK Accuracy Memorandum (CCP-TP-005 Attachment 14) is used to document the percentage of containers reassigned to a new Waste Matrix Code, designated with a HWN assignment different from AK, or inconsistent with anticipated radionuclide composition determined from AK when compared to CCP testing and Permittee confirmation testing results. AK Accuracy reports may be issued for waste stream lots at a minimum, annually.
- AK Re-Evaluations (CCP-TP-005 Attachment 10) are issued when: inconsistencies noted during the process of comparing AK information to characterization results or the initiation of a nonconformance report (NCR) that identifies potential changes to the AK of a waste stream (including NCRs generated as a result of discrepancies identified during confirmation performed by the Permittee).

AK Briefings are also offered by CCP AKEs to ensure that CCP characterization personnel involved are trained to the following for a given waste stream:

- Mission and generating facility information, including process(es) generating the waste
- Waste stream description and information, including description of physical waste composition, waste matrix parameters, waste matrix code
- Radiological characteristics
- Chemical characteristics
- Suspected prohibited items
- Waste packaging

*NEW: The briefings now include the generator points of contact or subject matter experts (POCs/SMEs), or cognizant designees, as the participation of site representatives directly involved with generation, characterization, and management of containers in the waste stream to help ensure that the AK Summary Reports are complete and accurate. Briefing updates are also prepared and provided when AK Summary Report Revisions are made when changes to waste stream physical/chemical/radiological composition occur, and will include discussion of the IWMDL.*

## Appendix B - Chapter 18 of the WIPP Documented Safety Analysis (DSA) and DOE Accident Board Findings

The DSA addresses the WIPP Waste Acceptance Criteria Compliance Program. DSA Chapter 18 states, “[S]everal new activities and process enhancements were established after the 2014 Radiological Release Event.” Specifically, enhanced AK was identified, which includes the following:

- Interface Waste Management Document List (IWMDL), which is a list of documents governing waste management and packaging activities at generator sites and associated procedure walk down.
  - The chemical compatibility evaluation memorandum, (CCEM) written by the Certified Programs using procedural requirements based on the method described in the 1980 EPA method EPA-600/2-80-076, *A Method for Determining the Compatibility of Hazardous Wastes* (EPA Method).
  - The Basis of Knowledge Document will be provided by the Carlsbad Field Office (CBFO) and implemented in conjunction with the AK procedures of the Certified Programs. The Basis of Knowledge Document will specify when waste with oxidizing chemicals is acceptable as is, or when treatment will be required along with the treatment that must be performed. CBFO representatives have indicated this document may be completed during the summer of 2016, and is being performed at CEMRC laboratories in Carlsbad.
  - DSA Chapter 18 also states that “All currently certified waste containers in the complex as well as those containers continuing to be certified will undergo the following prior to shipment: 1) Certified Program will implement an enhanced AK process including an enhanced chemical compatibility evaluation for the waste streams, or waste stream sub-populations, and submits to CBFO for review; and 2) Certified Programs will implement the Basis of Knowledge document in the AK process for evaluating oxidizing chemicals in TRU waste streams to determine acceptability or need for treatment.”
- The DOE Accident Investigation Board (AIB) identified Judgement of Needs (JONs) related to acceptable knowledge including but not limited to:
    - **JON 1:** The National Transuranic (TRU) Program needs to re-evaluate and strengthen the flow down of requirements regarding the compilation of Acceptable Knowledge (AK) in order to more clearly demonstrate that the WIPP HWFP, Attachment C, WAP waste characteristics prohibitions and chemical compatibility requirements are met consistent with 40 CFR 261.21.
    - **JON 2:** The National TRU Program needs to reevaluate and strengthen the certification audit process across the DOE complex at all generator sites to include:
      - Evaluation of waste generator repackaging operations that prepare TRU waste for characterization;

- Implementation of waste generator site processes as they relate to TRU waste management;
  - Verification that changes to processes are correctly incorporated into acceptable knowledge summary reports;
  - Verification of effective implementation documentation and programs to ensure that
  - waste generator activities comply with the generator site Resource Conservation and
  - Recovery Act (RCRA) permit; and
  - Evaluation of local site office oversight of TRU waste operations.
- **JON 3:** NA-LA oversight of characterization and certification of TRU waste sites needs to be improved to include:
    - Waste Characterization, Reduction, and Repackaging Facility (WCRRF) repackaging operations that prepare TRU waste for characterization;
    - Implementation of waste generator site processes as they relate to TRU waste management; and
    - Verification that waste generator activities comply with the generator site Resource Conservation and Recovery Act (RCRA) permit.
  - **JON 4:** The CBFO oversight of characterization and certification of TRU waste sites needs to be improved to include:
    - Waste generator repackaging operations that prepare TRU waste for characterization;
    - Implementation of waste generator site processes as they relate to TRU waste management;
    - Verification of effective implementation documentation and programs to ensure that waste generator activities comply with the generator site Resource Conservation and Recovery Act (RCRA) permit; and
    - Evaluation of local site office oversight of TRU waste operations.
  - **JON 7:** The Central Characterization Program (CCP) needs to improve implementation of requirements in CCP-PO-001 such that characterization methods are able to ensure that all WIPP Waste Acceptance Criteria (WAC) requirements are met.
  - **JON 8:** The CCP needs to improve the level of rigor in reviewing and approving AK summary reports for compliance with requirements.
  - **JON 12:** The Central Characterization Program (CCP) needs to reevaluate and strengthen the process used to conduct review and approval of source documents that have an impact on Acceptable Knowledge.
- The DOE recently revised the WIPP Waste Acceptance Criteria (Revision 8.0, Effective Date: July 5, 2016) that, once implemented, addresses enhanced AK as follows in Appendices H and I:

- **H.1:** After the 2014 radiological release event, several new activities and process enhancements were established. One of these enhancements was to provide additional controls over the collection, verification, and validation of AK, thus resulting in a more robust AK program referred to as Enhanced Acceptable Knowledge (Reference 4, Chapter 18.4.2.1). Use of these newly established controls by the WCPs is expected to ensure the receipt of WIPP WAC compliant waste containers.
- **H.2 Interface Waste Management Documents List (IWMDL)** The IWMDL, which is generated by the WCP, identifies DOE site plans, procedures, and reports associated with current waste management and packaging (e.g., waste management, waste generation, waste treatment, waste packaging, waste repackaging, waste remediation, waste stream delineation, and waste characterization procedures) to be reviewed before containers are added to the Waste Containers List or Container Tracking Spreadsheet in order to continue characterization activities. TRU waste will not be provided to the WCP until the IWMDL is updated with the latest version of the procedure...
- **H.3 Certified Program Enhanced Chemical Compatibility Evaluation**
  - As part of the process for characterizing and certifying TRU waste for disposal at WIPP, it is necessary to consider the range of possible chemical combinations that could occur in each waste stream. Potential adverse chemical reactions (e.g., generation of heat, fire, explosion, or toxic fumes) that stem from combining potentially incompatible chemicals must be evaluated to support safe and compliant waste management. To expand upon this evaluation, chemical compatibility has been enhanced to require formal documentation and generation of a chemical compatibility evaluation memo (CCEM) for the waste stream, or sub-population of the waste stream, as needed. The CCEMs are written by the WCPs using procedural requirements based on the method described in the 1980 EPA method EPA-600/2-80-076, "A Method for Determining the Compatibility of Hazardous Wastes" (EPA Method). The CCEM will document and communicate the evaluation including the conclusions. CCEMs concluding the potential for chemical incompatibility will provide the basis for placing an administrative hold on the affected waste via issuance of a nonconformance report (NCR). CCEMs concluding the potential for chemical incompatibility are provided to the CBFO for information only...
- **H.4 Basis of Knowledge for Evaluating Oxidizing Chemicals in TRU Waste.** The Basis of Knowledge Document will be provided by CBFO and implemented in conjunction with the AK procedures of the WCPs. The Basis of Knowledge Document will specify when waste with oxidizing chemicals is acceptable as is, or when treatment will be required along with the treatment that must be performed...
- **H.5 Certified Program Acceptable Knowledge Assessments.** To ensure that the AK documentation relating to the management of potentially reactive, corrosive, ignitable, and incompatible TRU waste materials is adequate, current, and accurately described in existing AK Summary Reports, a onetime AK assessment will be performed for waste streams having a currently certified container in a waste stream that has a population of unshipped containers.

- **H.6 AK Briefings.** AK Briefing updates are required when the AK Summary Report requires revision due to changes in the waste stream characteristics (physical, chemical, or radiological composition) or packaging configuration. Include a discussion of the waste management and packaging activities verified during preparation of the current Interface Waste Management Documents list prepared for the waste stream. The AKE/SPM must emphasize the importance of maintaining current procedures in the AK record. AK Briefings are prepared and presented the generator POCs/SMEs, or cognizant designees. The participation of these site representatives from the groups directly involved with the generation, characterization, and management of containers in the waste stream will further ensure that the description of the waste streams in the AK Summary Reports are complete and accurate.
- **Appendix I** states that for all currently certified waste containers in the complex following prior to shipment:
  - o Certified Program will implement an enhanced AK process including an enhanced chemical compatibility evaluation for the waste streams, or waste stream sub-populations, and submits to CBFO for review.
  - o Certified Programs will implement the Basis of Knowledge document in the AK process for evaluating oxidizing chemicals in TRU waste streams to determine acceptability or need for treatment.
  - o CBFO will concur with enhanced chemical compatibility evaluation and implementation of the Basis of Knowledge for the evaluated waste stream.
  - o CBFO will approve waste streams with acceptable enhanced chemical compatibility evaluation documentation provided by the Certified Programs.