Subject: Approval of the Basis of Knowledge Evaluation and Release Approval for Waste Stream LA-OS-00-01.001, Revision 0, Off-Site Source Recovery Project Sealed Sources at LANL per CBFO MP 4.15

Dear Mr. Lee:

The Carlsbad Field Office (CBFO) has received your request dated October 31, 2017 for the review and approval of the Basis of Knowledge (BoK) Criteria Evaluation for Waste Stream LA-OS-00-01.001, Revision 0, Off-Site Source Recovery Project Sealed Sources at the Los Alamos National Laboratory (LANL). Your memorandum has determined that there are no oxidizing chemicals in this waste stream. The CBFO has reviewed your evaluation and has concluded that this waste stream does not contain oxidizing chemicals and therefore is not subject to the BoK evaluation.

Per CBFO Management Procedure 4.15, Section 5.3, Currently Certified Waste, as evidenced in the enclosure, the CBFO has verified this waste stream LA-OS-00-01.001 at LANL has met the necessary requirements. The Central Characterization Program is authorized to use and enter containers into the Waste Data System using approved procedures for characterizing and certifying TRU waste for shipment to and disposal at the Waste Isolation Pilot Plant (WIPP).

This letter and supporting documentation fulfills the CBFO requirements of the WIPP Documented Safety Analysis, Rev. 5.b, Chapter 18.8.

If you have any questions, please contact me at (575) 234-7313.

Sincerely,

J. R. Strobie,
Office of National TRU Program
Compliance Division Director

Approval:

Jeffrey Carswell, Acting Manager
Senior Technical Safety Manager

Enclosure: MP Form 4.15-3 (including Objective Evidence)
cc: w/enclosure

J. Carswell, CBFO  * ED
G. Basabivazo, CBFO  ED
G. Birge, CBFO  ED
M. Brown, CBFO  ED
T. Carver, CBFO  ED
N. Castaneda, CBFO  ED
H. Cruickshank, CBFO  ED
C. Fesmire, CBFO  ED
W. Mackie, CBFO  ED
S. Foster, CBFO  ED
S. Hunt, CBFO  ED
D. Miehls, CBFO  ED
D. Standiford, CBFO  ED
K. Watson, CBFO  ED
E. Espinosa, EM  ED
M. Pearcy, NWP  ED
R. Lee, NWP  ED
M. Ramirez, NWP  ED
V. Ballew, NWP  ED
J. Biedscheid, NWP  ED
L. Burns, NWP  ED
J. Carter, NWP  ED
M. Devarakonda, NWP  ED
T. Groover, NWP  ED
C. Hatch, NWP  ED
R. Kantrowitz, NWP  ED
J. Knox, NWP  ED
R. Martin, NWP  ED
M. McDaniel, NWP  ED
B. Pace, NWP  ED
R. Reeves, NWP  ED
B. Schrock, NWP  ED
C. Simmons, NWP  ED
C. Soatema, NWP  ED
J. Stepzinski, NWP  ED
L. Turner, NWP  ED
D. Wade, NWP  ED
R. Chavez, RES  ED
K. Lickliter, CTAC  ED
P. Martinez, CTAC  ED
M. Doherty, CTAC  ED
N. Elkins, LANL-CO  ED
T. Burns, LANL-CO  ED
B. Crawford, LANL-CO  ED
B. Lemons, LANL-CO  ED
L. Watson, LANL-CO  ED
J. Trone, SNL  ED
T. Greenwood, TechSpecs  ED
E. Lickliter, TechSpecs  ED

J. Webb, TFE, Inc.  ED
S. Gonzalez, TFE, Inc.  ED
F. Ybarra, TFE, Inc.  ED
Site Documents  ED
WIPP Operating Record  ED
CBFO M&RC  * ED denotes electronic distribution
# CURRENTLY CERTIFIED WASTE CHECKLIST

**Site:** LANL-CCP  
**Waste Stream:** LA-OS-00-01.001 Containers at LANL

<table>
<thead>
<tr>
<th>No.</th>
<th>Criterion</th>
<th>Yes/No</th>
<th>Objective Evidence Reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Has the Certified Program implemented an enhanced AK process including an enhanced chemical compatibility evaluation for the waste streams, or waste stream sub-populations?</td>
<td>YES</td>
<td>Letter CBFO:ONTP:NCD:JRS:PG:17-2350:UFC 5900.00 dated October 31, 2017, Concurrence and Approval for Chemical Compatibility Evaluation Memorandum for Waste Stream LA-OS-00-01.001, Revision 0 (containers stored at LANL)</td>
</tr>
<tr>
<td>2</td>
<td>Has the Certified Program implemented the Basis of Knowledge document in the AK process for evaluating oxidizing chemicals in TRU waste streams to determine acceptability or need for treatment?</td>
<td>YES</td>
<td>CCP Document Services Technical Editor, Fabian Ybarra email dated October 31, 2017</td>
</tr>
</tbody>
</table>
| 3   | Did CBFO concur with enhanced chemical compatibility evaluation and implementation of the Basis of Knowledge for the evaluated waste stream? | YES | a) See the approval for the CCE in checklist No. 1 above. Letter CBFO:ONTP:NCD:JRS:PG:17-2350:UFC 5900.00 dated October 31, 2017, Concurrence and Approval for Chemical Compatibility Evaluation Memorandum for Waste Stream LA-OS-00-01.001, Revision 0 (containers stored at LANL)  
b) Letter CBFO:ONTP:NCD:JRS:PG:17-2358:UFC 5900.00, dated November 7, 2017 (the letter this checklist is attached to) |
| 4   | Have the WIPP M&O Contractor Payload Engineers evaluated TRUCON codes to ensure compliance with the enhanced chemical compatibility evaluation? | YES | CBFO Memorandum CBFO:OTNP:NOD:JRS:17-2364:UFC 5822.00, Issue and Implementation of DOE/WIPP 01-3194, Rev 58, CH-TRU Waste Content Codes (CH-TRUCON) dated November 6, 2017 |
| 6   | Did the WIPP M&O Contractor obtain written approval from CBFO prior to release of waste streams for shipment? | YES | Letter CBFO:ONTP:NCD:JRS:PG:17-2358:UFC 5900.00, dated November 7, 2017 (the letter this checklist is attached to) |
| 7   | Has the WIPP M&O Contractor verified each container requested is part of a CBFO-approved waste stream and is it authorized for shipment in WDS? | YES | See the response to checklist No. 5 above |
| 8   | Certified Program implemented an AKA and/or IWMDL as appropriate. | YES | See the response to checklist No. 5 above |

Approval:  

J. R. Straße  

Print and Sign  

Date: 11-7-17

STS M:  

J. M. Carpenet  

Print and Sign  

Date: 11-7-17
CBFO Form 4.15-3
Currently Certified Waste Checklist #1 and 3a

Letter
CBFO:ONTP:NCD:JRS:PG:17-2350:UFC 5900.00 dated October 31, 2017,
Concurrence and Approval for Chemical Compatibility Evaluation Memorandum for Waste Stream LA-OS-00-01.001, Revision 0 (containers stored at LANL)
Mr. Ronnie Lee, Manager  
Central Characterization Program  
National TRU Program  
Nuclear Waste Partnership LLC  
P.O. Box 2078  
Carlsbad, NM 88221-2078

Subject: Concurrence and Approval for Chemical Compatibility Evaluation Memorandum for Waste Stream LA-OS-00-01.001, Revision 0 (containers stored at LANL)

Dear Mr. Lee:

The Carlsbad Field Office (CBFO) has reviewed the Chemical Compatibility Evaluation Memorandum for Waste Stream LA-OS-00-01.001, Revision 0 (containers stored at LANL). The CBFO has reviewed and determined that the comments generated have been adequately addressed and the memorandum meets the CBFO requirements using CBFO MP 4.15, Review of TRU Waste Acceptable Knowledge Documents. Please see the enclosed CBFO Form 4.15-2, Chemical Compatibility Evaluation Checklist.

The CBFO, therefore, approves waste stream LA-OS-00-01.001. The Central Characterization Program is authorized to use waste stream LA-OS-00-01.001 in the Waste Data System (WDS) and to enter containers into the WDS using your approved procedures for characterizing and certifying Transuranic (TRU) waste for shipment to and disposal at the Waste Isolation Pilot Plant (WIPP).

If you have any questions, please contact me at (575) 234-7313.

Sincerely,

[Signature]

J. R. Stroble, Director  
Office of the National TRU Program  
Compliance Division

Jeffrey Carswell  
CBFO Senior Technical Safety Manager

Enclosures: MP Form 4.15-1  
MP Form 4.15-2
cc: w/enclosures

J. Carswell, CBFO       * ED     J. Trone, SNL       ED
G. Basabilvazo, CBFO   ED      R. Chavez, RES       ED
G. Birge, CBFO         ED      V. Bynum, CTAC       ED
M. Brown, CBFO         ED      M. Doherty, CTAC     ED
T. Carver, CBFO        ED      K. Lickliter, CTAC    ED
N. Castaneda, CBFO     ED      T. Greenwood, TechSpecs ED
H. Cruickshank, CBFO   ED      E. Lickliter, TechSpecs ED
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S. Hunt, CBFO          ED      R. Brown, Site Documents ED
D. Miehls, CBFO        ED      P. Gilbert, Site Documents ED
D. Standiford, CBFO    ED      WIPP Operating Record    ED
K. Watson, CBFO        ED
D. Hintze, EM-LA       ED
D. Nickless, NNSA      ED
P. Maggiore, NNSA      ED
B. Covert, NWP         ED
M. Pearcy, NWP         ED
M. Ramirez, NWP        ED
V. Ballew, NWP         ED
J. Biedscheid, NWP     ED
L. Burns, NWP          ED
J. Carter, NWP         ED
M. Devarakonda, NWP    ED
T. Groover, NWP        ED
C. Hatch, NWP          ED
R. Kantrowitz, NWP     ED
J. Knox, NWP           ED
R. Martin, NWP         ED
M. McDaniel, NWP       ED
B. Pace, NWP           ED
R. Reeves, NWP         ED
B. Schrock, NWP        ED
C. Simmons, NWP        ED
C. Soatena, NWP        ED
J. Stepzinski, NWP     ED
L. Turner, NWP         ED
D. Wade, NWP           ED
P. Martinez, CTAC      ED
T. Burns, LANL-CO      ED
B. Crawford, LANL-CO   ED
N. Elkins, LANL-CO     ED
B. Lemons, LANL-CO     ED
L. Watson, LANL-CO     ED

*ED denotes electronic distribution
CARLSBAD FIELD OFFICE

ACCEPTABLE KNOWLEDGE DOCUMENT REVIEW RECORD

SITE: LANL

DOCUMENT TITLE: Chemical Compatibility Evaluation for Waste Stream LA-OS-00-01.001

DOCUMENT NUMBER AND REVISION: CCE8001

TYPE OF REVIEW: Technical

ASSIGNED REVIEWER: Gary Birge CBFO, R. V. Bynum CTAC, Mark Doherty CTAC

FORWARD RESPONSE TO: Site.Documents@wipp.ws

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Na</td>
<td>Na</td>
<td>This document was previously reviewed and comments provided. This was presented as a new draft without responses to the previous comments. The previous comments must be addressed, or the previous version withdrawn and this version treated as a new submittal.</td>
<td>Per conversation with Vann, all previous comments are covered in this DRR.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Introduction</td>
<td>Why include this text &quot;which includes the assignment of Hazardous Waste Numbers (HWNs) D001, D002, or D003.&quot;?</td>
<td>Removed</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Executive Summary</td>
<td>Line 10—The projection uses the past tense. Is there a more recent projection? If not, present tense is more appropriate.</td>
<td>Changed to present tense.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Introduction</td>
<td>First sentence—a reference is necessary for the ambient temperature.</td>
<td>Reference has been added.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Introduction</td>
<td>Second paragraph—if some of the sources are leaking, which it appears there are, the internal materials must also be taken into consideration.</td>
<td>Incorporated. Added a bullet to this section to include source material and target material.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
## ACCEPTABLE KNOWLEDGE DOCUMENT REVIEW RECORD (continuation)

**Doc #, Rev #, Title:** Chemical Compatibility Evaluation for Waste Stream LA-OS-00-01.001

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<tr>
<td>6</td>
<td>4</td>
<td>Introduction</td>
<td>Next to last paragraph on this page—There is still confusion between the potential for an adverse reaction and the likelihood of an adverse reaction consequence. If two incompatible materials are present, then the potential for an adverse reaction exists. If after evaluating things such as concentration, material form, quantity, waste management practices, etc. the combination of the two materials is incompatible sufficient to create one of the adverse reaction consequence listed at the top of this page and in CFR 264.17. Please ensure consistent use of this language for clarity.</td>
<td>Added additional language to the methodology section to address this. &quot;...an adverse reaction consequence to occur as described in this section.&quot;</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>TA2</td>
<td>Some of the sources have external contamination, presumably from leakage. Additional details are required to provide assurance that any potentially leaking sources are placed in SFCs prior to being packaged into POCs. Additionally, the test conditions for the SPCs need to be clearly demonstrated to be at least as severe, with an appropriate margin of safety, as the conditions that could arise from leakage of the NSF sources and complete reaction of their contents. Possibly this information is within one of the source documents, but not all source documents were made available for this review and the information should appear at least in summary form in the CCEM.</td>
<td>Additional wording has been added to TA2 to clarify that contaminated sources were also placed into SFCs before being loaded into POCs. This is supported by source document C8079. Additional language was added to explain that the SFCs are required to pass the same rigorous tests as the sources that are manufactured and certified as special form. The relevant source documents are in CCP Records (most notably D8031 and M8145). Because the SFCs and special form sources must meet the same testing requirements, then the SFC still protect its contents just as the special form sources do, due to similarities in the robustness of sources manufactured and certified as special form sealed sources and LANL's special form capsule, which meet the same testing requirements, it is assumed that they would have an equal ability to prevent adverse reaction consequences from occurring.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
# Doc #: Rev #, Title: Chemical Compatibility Evaluation for Waste Stream LA-OS-00-01.001

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<tbody>
<tr>
<td>8</td>
<td>6</td>
<td>TA2, 3 &amp; 4</td>
<td>These Technical Assumptions do not constitute an assumption. TA2 is good background material regarding SF and NSF sources, and TA3 and TA4 are more appropriate in the methodology section since it describes how you are determining compatibility.</td>
<td>Added additional language to each TA. These TAs were included based on CCP reviews of the document and help explain the assumptions that were made to aid in the evaluation of the materials listed in the attachments.</td>
</tr>
</tbody>
</table>

- **TA#2** updated to include: "Because the SFCs and "special form" sources must undergo the same testing, then they have the equal ability to prevent an adverse reaction consequence as described in the Methodology section."

- **TA#3** updated to include: "Lastly, polymers with documented or suspect reactivity concerns are segregated to ensure unique evaluations and/or assumptions are established for these polymers if necessary. Finally, all polymers are evaluated and assumed to react as potential combustible materials (RGN 101) given the WIPP-WAC requirements. There is no potential for an adverse reaction consequence, as described in the Methodology section, between polymers and extremely reactive materials present within LA-OS-00-01. See Technical Assumptions above regarding encapsulation and Attachments 1 and 2 for further evaluation."

- **TA#4** updated to include: "Alloys are grouped according to the primary constituent (i.e., iron-based metal/alloys, aluminum based metal/alloys) and evaluated under the assumption that the alloy will react similarly as the primary constituent. There is no potential for an adverse reaction consequence, as described in the Methodology section, between metals/alloys and extremely reactive materials present within LA-OS-00-01. See Technical Assumption above regarding encapsulation and Attachments 1 and 2 for further evaluation."
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<tbody>
<tr>
<td>9.</td>
<td>7</td>
<td></td>
<td>Clarify when you intend to update the AKSR.</td>
<td>The CCE has been revised to read as follows:</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>However, AKSR CCP-AKL-008 is currently under revision and will include information documented in this CCEM, including a more detailed description of packaging and packaging-related materials and chemicals.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>7</td>
<td>TA5</td>
<td>While this is a good TA, there is insufficient basis for its assertion. Why wouldn’t a microfracture be conducive to an adverse reaction consequence? The answer to that question must be presented. Note that source documents C8079 and M8327 were not immediately available for this review. Additionally, M8327 does not appear in the reference list. Please verify that the reference list is complete and accurate.</td>
<td>Further explanation was included. M8327 has been added to the reference list. Both M8327 and C8079 are available in CCP Records.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>11.</td>
<td>8</td>
<td>Attachment 1</td>
<td>Lithium—pyrophoric metals are prohibited by the WAC which does not contain any provision for allowing them if contained and separated from potential reactants.</td>
<td>Further justification has been provided. The state and CBFO approved WSPF has also been referenced.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>12.</td>
<td>8</td>
<td>Attachment 1</td>
<td>No mention is made in this attachment nor in Attachment 4 of PPE, wipes, etc being in the waste containers. It has been (and likely still is) common practice to drop gloves, wipes, and misc PPE into a drum when it is being closed as opposed to creating a new drum for these small quantities of material. Given their absence in the CCEM, discovery of such materials would necessitate revisiting the CCEM for the impacts of these materials before proceeding. Suggest you reconsider this approach.</td>
<td>The topic is covered in the executive summary which states: Additional materials that may be added during packaging include damage materials (as an approved part of the POC configuration), shielding, source holders and engineered bracing materials. These materials consist of fiberboard, plywood, polyethylene shielding, polyurethane foam, water extended polyester resin, high density polyethylene, steel, acrylic, and aluminum. OSRP does not perform decontamination, and no swipes or other debris are placed in this waste stream. No sorbents are added during packaging.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>#</td>
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<td>COMMENT (Cts Req, if applicable)</td>
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<tr>
<td>13</td>
<td>9</td>
<td></td>
<td>The clear source holder is polymethyl acrylate, RGN 13.</td>
<td>While polymers of esters possess the functional group associated with the name, (RGN 13, Ester) the reactivity is better represented by the bounding RGN 101, combustible material. This is concluded by 1) Hatayama’s 1980 Method lists ‘Resins’ as an example of RGN 101 material in addition to many other polymeric analogues without specificity to functional groups (ex. Polyurethane is assigned RGN 101 despite possessing the carbamide functional group, methyl acetone possesses a ketone but is represented as RGN 101 and not RGN 19, etc.) 2) Given the dry-waste material environment, carbon derived polymers are best evaluated as potential fuels for combustion since functional groups are much less available to interact with surrounding material. See updated TA#3, for establishing RGN 101 for the reasons described above.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>11</td>
<td></td>
<td>Krytoz. Add RGN 14 for the ether component and RGN 15 for the fluoride component.</td>
<td>RGN 101 was directed by TRUCON reviewers. Author supports RGN 101 assignment based on 1) polyfluoro ethers are distinct from hydrocarbon ethers 2) RGN 15 is specific to inorganic fluorides which this compound is an organofluorine polymer and does not meet the definition of a dissociable metal fluoride salt.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>12</td>
<td></td>
<td>Plastics. Add RGN 13 for the polymethyl acrylate.</td>
<td>see response to comment 2</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>11</td>
<td></td>
<td>Add RGN 13 for the polymethyl acrylate, RGN 14 for the ether component and RGN 15 for the fluoride component.</td>
<td>See combined responses to comment 2 and 3.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>13</td>
<td></td>
<td>Add RGNs 13, 14 and 15.</td>
<td>If previous comments are accepted, this change will not be necessary.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>16</td>
<td>Attachment 4</td>
<td>Note 2—please provide a source document and description of the Be passivation. It is stated to be a Be foil, but then is stated that it is brazed in place. It would be extremely difficult to braze a foil, bringing into question whether all of these items were indeed foils or a more substantial Be plate. Also, note 2 does not address the full spectrum, and likely more significant quantities of Be in targets and brazes.</td>
<td>Note 2 was removed. Note 1 was added. Any beryllium present would be in trace quantities.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>16</td>
<td>Attachment 4</td>
<td>Please define HSG which appears in the Volatile Organics entry.</td>
<td>Incorporated.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
### Chemical Compatibility Evaluation for Waste Stream LA-OS-00-01.001

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<tr>
<td>20.</td>
<td></td>
<td></td>
<td>Chemicals listed in Attachment 1 not found in the AKSR: beryllium oxide, Krytox LVP fluorinated grease, polyurethane foam, resins, rubbers.</td>
<td>Noted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td></td>
<td></td>
<td>Source documents reviewed: C8004, C8032, C8066, C8078, C8082, C8066, C8066, D8001, D8002, D8011, D8057, M8343, P8007.</td>
<td>Noted</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>End of Comments</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COMMENT RESOLUTION APPROVED:

![Signature]

NTP Signature Courtright Fesmire

For J.R. Strable

30 Oct 2019

Date
# Chemical Compatibility Evaluation Checklist

## Site:
CCP LANL

## CCEM Name:
LA-OS-00-01.001, Rev.0 Draft H

<table>
<thead>
<tr>
<th>No.</th>
<th>Criterion</th>
<th>Result/Comments</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Has the Certified Program performed a satisfactory review of the CCEM?</td>
<td>Yes.</td>
</tr>
<tr>
<td>2</td>
<td>Does the CCEM match the current revision of the AK Summary Report?</td>
<td>Yes.</td>
</tr>
<tr>
<td>3</td>
<td>Do the chemicals listed in the CCEM match those listed in the AK Summary Report or is there a revision pending to include those that are not listed?</td>
<td>Yes; however the inconsistencies between the chemicals listed in the CCEM and the AKSR will be resolved in a future revision to the AKSR.</td>
</tr>
<tr>
<td>4</td>
<td>Are the chemicals in the CCEM assigned to the correct RGNs?</td>
<td>Yes.</td>
</tr>
<tr>
<td>5</td>
<td>Are those chemicals assigned &quot;NA&quot; non-reactive?</td>
<td>Yes.</td>
</tr>
<tr>
<td>6</td>
<td>Do the assigned RGNs match those listed in the summarized reactions table and the binary compatibility chart?</td>
<td>Yes.</td>
</tr>
<tr>
<td>7</td>
<td>Are the assumptions used to dismiss chemicals from consideration reasonable?</td>
<td>Yes. Source documents reviewed: C8004, C8032, C8066, C8078, C8079, C8082, C8066, C8066, D8001, D8002, D8011, D8057, M8327, M8343, P8007.</td>
</tr>
<tr>
<td>8</td>
<td>Are the assumptions used to assign chemical concentrations or quantities reasonable?</td>
<td>Yes.</td>
</tr>
<tr>
<td>9</td>
<td>Are there new AK source documents generated to supplement the CCEM? If so, request and review them as necessary.</td>
<td>Source document numbering as shown in the AKSR has been updated since the AKSR was issued. The source documents now have numbering to reflect a LANL-wide library. See Item 7 for the list of sources reviewed. C8066, C8078, C8079, C8080, C8082, C8083, C8084, C8086, D8031, D8053, D8056, D8057, M8327, M8343. Reviewed C8066, C8078, C8079, C8082, C8086, D8057, M8327, M8343.</td>
</tr>
<tr>
<td>10</td>
<td>Are the compatibility conclusions consistent with the RGN assignment and assumptions (no reaction or the reaction is not significant)?</td>
<td>Yes.</td>
</tr>
<tr>
<td>11</td>
<td>Do the compatibility conclusions justify that the waste stream is incapable of initiating an unexpected or incompatible hazardous reaction?</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

## Approval:

Print and Sign: **COURRANT FESMIRE**

Date: **30 Oct 2010**

STSM:

Print and Sign: **J.M. CANTWELL**

Date: **30 Oct 2017**
WASTE STREAM CHEMICAL COMPATIBILITY EVALUATION MEMORANDUM

TO: Daniel Wade, CCP Site Project Manager
FROM: Jason Montoya, CCP Acceptable Knowledge Expert
DATE: October 26, 2017 – Revision 0
RE: Chemical Compatibility Evaluation for Waste Stream LA-OS-00-01.001

Executive Summary

The purpose of this memorandum is to document the chemical compatibility evaluation (CCE) required by CCP-TP-005, CCP Acceptable Knowledge Documentation, for waste stream LA-OS-00-01.001. As described in CCP-AK-LANL-008, Central Characterization Project Acceptable Knowledge Summary Report for Los Alamos National Laboratory Off-Site Source Recovery Project Sealed Sources, Waste Streams LA-OS-00-01.001, LA-OS-00-03, and LA-OS-00-04, Revision 9, Waste Stream LA-OS-00-01.001 consists of manufactured sealed sources which are packaged in pipe overpack containers (POCs) inside 55-gallon drums. There are currently approximately 1300 55-gallon drums in the waste stream, including those that have been disposed at WIPP. It is projected that 1128 containers would be added to the waste stream between 2010 and 2025. Generation of the waste stream began in 2000 and is ongoing. The sources are encapsulated in various metals and alloys (i.e., steel, aluminum, tantalum, platinum, iridium, titanium, tungsten, silver, palladium, nickel, copper, gold, and iron). The confining barrier ensures containment of the radioactive source material under normal and most accidental conditions. The sealed sources contain varying amounts of plutonium, americium, cesium, and their daughter products. Sources may also contain beryllium, lithium, or other light elements (i.e. boron, carbon, fluorine, and oxygen) to create neutron emissions. Additional materials that may be added during packaging include dunnage materials (as an approved part of the POC configuration), shielding, source holders and engineered bracing materials. These materials consist of fiberglass, plywood, poly/lead shielding, polyurethane foam, water extended polyester resin, high density polyethylene, steel, acrylic, and aluminum. OSRP does not perform decontamination, and no swipes or other debris are placed in this waste stream. No sorbents are added during packaging.

Conclusions

The bounding conditions defined in this CCE demonstrate that the contents of waste stream LA-OS-00-01.001 are acceptable for disposal at WIPP with respect to chemical compatibility. The waste form and characteristics render components unavailable for reaction with other waste items; ensure that the potential reactivity of constituents is mitigated; or ensure that any potential incompatible reactions would not result in an adverse reaction consequence as described in the Methodology section. The final
waste form has been determined to be incapable of initiating the adverse chemical reaction consequences identified in the Methodology section. The final determination for acceptability is also contingent upon several factors including the Acceptable Knowledge Assessment (AKA8001), if applicable, and the Interface Waste Management Document List (IWM DL) process verifying that the waste stream contents are bounded by the waste components present in the CCE.

Introduction

The purpose of the CCE is to determine if the chemicals and materials in the waste stream are compatible. This CCE does not address Resource Conservation and Recovery Act (RCRA) hazardous waste determinations for the waste stream. The CCE/AKA process is an iterative process, as each relies on the other. The Acceptable Knowledge (AK) summary report and the source documents cited herein provide the chemical and material input information to perform the CCE.

This CCE identifies and evaluates any potential adverse chemical reaction (e.g., generation of fire, explosion, heat, or fumes), as described in the Methodology section, that stem from combining chemicals from within and between the waste stream LA-OS-00-01.001 waste containers to ensure compatibility of drum content. Specifically, this CCE focuses on the compatibility of waste components including, but not limited to the following:

- Metals associated with source encapsulation and special form capsules (SFC)
- Additional external components associated with some sources
- Materials associated with source holders internal to the POC
- Metals associated with packaging
- Cane/plywood/fiberboard dunnage associated with packaging
- Plastics and rubbers associated with packaging
- Lubricant and resins associated with packaging
- Radiological and target material associated with sources

This evaluation is limited to verifying the compatibility of the chemicals and materials within the waste stream (including the packaging materials) and also provides information used to verify compatibility of this population of containers with other waste streams during TRUCON Code development.
Methodology/Approach

The following methodology was applied to determine the chemical compatibility of the constituents present in waste stream LA-OS-00-01.001. The chemicals and materials considered were compiled from the AK source documentation cited in the associated AK summary report (AKSR), CCP-AK-LANL-008, and documents that were not cited in the AKSR but were reviewed during this evaluation (e.g., Safety Data Sheets [SDSs] and additional source documents collected during this evaluation).

Quantity estimations for chemicals and materials presented in Attachment 1, Waste Stream LA-OS-00-01.001 Chemicals and Materials of Concern, were based on their documented use in procedures, manufacturer information, waste management practices, and waste packaging records. A conservative quantity estimation was assigned when information was inadequate to conclusively define a chemical or material quantity. Potential binary reactions between all constituents, including reaction products, which may produce an adverse reaction, were evaluated.

Based on this review, the identified chemicals and materials were conservatively assigned a quantity within an individual container as follows:

- Trace – less than 1 weight percent
- Minor – 1 to 10 weight percent
- Dominant – greater than 10 weight percent

The primary focus of this CCE is to assess potential reactions associated with dominant and minor constituents. However, some trace components could produce significant exothermic reactions without the proper actions being taken to mitigate the hazards associated with these chemicals and materials, and these components, therefore, must also be considered.

The quantity estimations reflect the AKE's best judgment, based on a review of the AK source documents collected in accordance with CCP-TP-005, and are conservative approximations. The AKE makes a qualitative evaluation based on the use of the given chemical/material as described in the AK source documents in the absence of actual quantitative information (e.g., analytical data, mass balance information, procedural recipes). When the available AK data are inconclusive, the more conservative concentration/quantity is assigned.

The RCRA Solid Wastes rules in 40 CFR 264.17(b), General Requirements for Ignitable, Reactive, or Incompatible Wastes, provide a list of adverse reactions that an owner or operator of a facility must be cognizant of and take measures to prevent when handling or treating their hazardous wastes. For purposes of this evaluation, this list of adverse reactions will be used as the standard for measuring the compatibility of chemicals and materials that can lead to these adverse reaction consequences when
mixed. The waste will be considered incompatible if it has the potential to create any one of the following adverse reactions:

1. Generate extreme heat or pressure, fire or explosions, or violent reactions;

2. Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment;

3. Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions;

4. Damage the structural integrity of the device or facility; and

5. Through other like means threaten human health or the environment

The evaluation of each potential reaction must demonstrate the absence of any of the five adverse reaction consequences listed above.

Guidance provided in the 1980 EPA method EPA-600/2-80-076, *A Method for Determining the Compatibility of Hazardous Wastes*, is the basis of this CCE for predicting adverse reaction consequences between groups of chemicals. The chemical groupings are assigned reaction group numbers (RGNs) and are based on molecular functional groups or physical characteristics of the chemicals and materials contained in the waste stream.

The EPA method provides a binary matrix for determining whether combinations of each RGN are compatible. Potential adverse reaction consequences are indicated by the presence of a Reaction Code in the matrix where two potentially incompatible RGNs intersect. The assignment of a Reaction Code is based on the assumption that the interacting chemicals or materials are in their pure form and are reacting under ambient temperature and pressure. Concentration, reaction rates, synergistic effects, and antagonistic effects have been assumed not to influence the reactions that may or may not result in a Reaction Code. Because of this, the presence or absence of a Reaction Code identified for the waste stream does not necessarily indicate if there is a potential for an adverse reaction consequence to occur as described in this section. Rather, the presence of a Reaction Code indicates that further evaluation of the specific chemical or material combinations must be performed. Therefore, additional variables that are considered in this CCE include: chemical use, chemical form (e.g., inhibited chemicals, degradation, consumed during use), and waste management practices (e.g., neutralization, passivation, immobilization), waste matrix effects, documented generator engineering judgment, and operational experience.

The RGNs assigned to each chemical and material are consistent with the guidance provided in the EPA method and other applicable databases, such as the Chemical Reactivity Worksheet developed by the EPA, the National Oceanic and Atmospheric Administration (NOAA), and others. Chemicals and materials that could be assigned
multiple RGNs based on chemical class or functional group are assigned the RGN(s) determined to be applicable by these methods. Chemicals and materials not listed in the EPA method or other applicable methods are assigned the most appropriate RGN(s) based on chemical class (functional group) and reactive properties based on review of chemical literature, SDSs, or industry documentation.

Individual chemicals and materials that possess similar reactivity and are assigned identical RGNs will be evaluated as an aggregate to best represent the reactivity concerns with these specific materials (e.g., resins, plastics, rubbers, cellulosics). If specific materials within a grouping require unique evaluation then details will be presented in Attachments 1 and 2.

To be considered eligible for disposal at the WIPP, the results of this CCE must demonstrate at least one of the following five conclusions for each potential chemical or material combination in the waste stream:

1. The chemical or material is not present in a quantity or form sufficient to produce an adverse reaction consequence.

2. The chemical or material, including reaction products, was rendered non-reactive or unavailable to produce an adverse reaction with other chemicals and materials in the waste stream.

3. Other chemicals or materials were rendered non-reactive, unavailable for reaction, or not present in the waste stream and will not result in an incompatible reaction with the chemical or material being considered.

4. Anticipated incompatible reactions have already occurred during waste generating processes or subsequent waste management activities (e.g., reaction of sodium metal, neutralization of acidic solutions, reaction of hydrofluoric acid on silica-based absorbents, oxidation of cellulosics by nitric acid) and will therefore not occur in the future.

5. The reaction between chemicals or materials will result only in inconsequential reactions and cannot lead to one of the five adverse reaction consequences described in 40 CFR 264.17(b).

The chemicals and materials in waste stream LA-OS-00-01.001 that did not demonstrate the first conclusion above are compiled in Attachment 1 which presents a description of the use of each chemical and material, estimated concentration, the assigned RGN(s), and a summary of the compatibility evaluation. All of the chemicals and materials listed in Attachment 1 were evaluated to identify their potential to form incompatible reactions corresponding to the assigned RGN based on the EPA Hazardous Waste Compatibility Chart in EPA-600/2-80-076. Attachment 2, Waste Stream LA-OS-00-01.001 Reactivity Group Number Compatibility Evaluation, presents a table showing each RGN combination based on RGNs identified in Attachment 1, and
an evaluation of potential incompatibilities based on the identified RGN combinations. Attachment 2 also provides the justification used to determine the compatibility of each RGN combination. Attachment 3, *EPA Hazardous Waste Compatibility Chart for Waste Stream LA-OS-00-01.001*, presents the compatibility chart depicting each RGN combination and potential Reaction Codes applicable to the waste stream.

The chemicals and materials that were determined to not be present in a quantity or form sufficient to produce an incompatible reaction (conclusion 1) are listed in Attachment 4, *Waste Stream LA-OS-00-01.001 Insignificant Trace Chemicals and Materials*. The justification for the determination for each chemical and material is provided. The chemicals and materials listed in Attachment 4 were not assigned RGNs and were not evaluated per the EPA method.

**Technical Assumptions**

1. **Sealed (Encapsulated) Sources**

   Per 10 CFR 835.2, *Occupational Radiation Protection*, a sealed radioactive source is a radioactive source manufactured, obtained, or retained for the purpose of utilizing the emitted radiation. The sealed radioactive source consists of a known quantity of radioactive material contained within a sealed capsule, sealed between layers of non-radioactive material, or firmly fixed to a non-radioactive surface by electroplating or other means intended to prevent leakage or escape of the radioactive material. Sealed sources are manufactured items that are manufactured such that their internal components are inherently compatible. Therefore, there is no concern for an adverse reaction consequence, as described in the Methodology section, within an encapsulated source (References C8016, C8060, C8079, D8002, D8005, D8010, D8011, D8012, D8015, D8022, D8031, M8005, M8012, M8014, M8018, M8041, M8042, M8133, M8145, and M8343).

2. **Special Form and Non-special Form Sources**

   For a sealed source to obtain an IAEA Certificate of Competent Authority issued by the Department of Transportation and be considered "special form," the capsule must successfully undergo rigorous testing per 49 CFR 173.469, *Tests for Special Form Class 7 (Radioactive) Materials*. Sealed sources that do not meet the definition of "special form" per 49 CFR 173.403, *Definitions*, are non-special form. Designation as non-special form could be due to external radiological contamination on the sealed source. All sealed sources, including sources that may have external radiological contamination, that are non-special form at the time of recovery by OSRP are placed into certified OSRP SFCs prior to being packaged into POCs. In order for the SFC to be considered "special form" and receive an IAEA Certificate of Competent Authority issued by the Department of Transportation, these capsules must successfully undergo the 49 CFR 173.469 testing requirements. Because the SFCs and "special form"
sources must undergo the same testing, then they have the equal ability to prevent an adverse reaction consequence as described in the Methodology section (References C8066, C8078, C8079, D8022, D8031, D8053, and M8145).

3. Rubbers, Resins, Plastics, and Cellulosic Material

The following guidelines were used to group polymers based on fundamental chemistry, ease of classification, and provide consistent entries throughout CCEMs. Firstly, different product types (i.e., plastic, resin, rubber, cellulosic) which may influence the reactivity considerations will be grouped to convey physical properties, common usage, and maintain waste material identity. Secondly, segregation according to degree of saturation (i.e., saturated or unsaturated) ensures that the polymer backbone, co-polymers, and any functional groups attached are represented for evaluation. Lastly, polymers with documented or suspect reactivity concerns are segregated to ensure unique evaluations and/or assumptions are established for these polymers if necessary. Finally, all polymers are evaluated and assumed to react as potential combustible materials (RGN 101) given the WIPP-WAC requirements. There is no potential for an adverse reaction consequence, as described in the Methodology section, between polymers and extremely reactive materials present within LA-OS-00-01. See Technical Assumptions above regarding encapsulation and Attachments 1 and 2 for further evaluation. (References 1, C8016, C8078, C8079, C8080, C8082, C8084, C8086, D8053, D8056, D8057; and P8001).

4. Metal Alloys

Alloys are grouped according to the primary constituent (i.e., iron-based metal/alloys, aluminum based metal/alloys) and evaluated under the assumption that the alloy will react similarly as the primary constituent. There is no potential for an adverse reaction consequence, as described in the Methodology section, between metals/alloys and extremely reactive materials present within LA-OS-00-01. See Technical Assumption above regarding encapsulation and Attachments 1 and 2 for further evaluation. (References C8016, C8078, C8080, C8083, C8084, D8010, D8011, M8012, M8014, M8039, M8041, M8042, M8058, M8145, M8343, and P8001).

5. Pyrophoric Metals

Some sources contain elemental lithium and/or plutonium. These sources are considered "special form" and must meet the requirements of 49 CFR 173.469. Sealed sources with lithium or plutonium sources are doubly encapsulated with the lithium and/or plutonium mixture contained in a welded stainless steel cylinder additionally encapsulated in an outer welded capsule. The EPA allows the use of best engineering judgment when determining if a material is reactive. Best engineering judgment includes observation of the waste material and the
use of manufacture information. Based on the construction, they would not react violently with water or generate toxic gases harmful to human health or the environment. In addition, the sources are not expected to rupture or react violently if exposed to a strong initiating source or if heated under confinement. The sources, as manufactured items, are not reactive, which is substantiated by the fact that manufacturers do not manage these sources as reactive (References 1, 2, C8004, C8032, C8035, D8031, M8025, M8026, and M8091).

Any source that does not meet the "special form" requirements (such as those that have external contamination possibly) are placed into OSRP SFCs prior to being loaded into POCs. Because "special form" capsules undergo such rigorous testing to ensure the integrity of the capsule under extreme conditions, there is no opportunity for an adverse reaction consequence as described in the Methodology section (Reference 3).

Some of the sources in this waste stream contain radiological contamination due to microfractures in the encapsulation material or cross-contamination from other sources. OSRP does not recover sources that are visibly damaged, breached, or have exposed source material. Radiological surveys taken on sources show that external contamination is minute, demonstrating that very little material is escaping encapsulation through the microfractures. Additionally, any source that has contamination is placed into an OSRP SFC prior to being packaged into a POC and is not available for reaction with materials external to the POC. However, chemical compatibility of both the encapsulation materials as well internal components of the sealed sources are evaluated in Attachments 1 and 2. Therefore, although unlikely, if the microfractures allowed for oxidation of these metals within an SFC, this would not be conducive to an adverse reaction consequence as described in the Methodology section (References C8079 and M8327).

Acceptable Knowledge Impacts

Additional chemicals/materials identified during this evaluation were determined not to affect the characterization of the waste stream LA-OS-00-01.001 described in the CCP-AK-LANL-008 (e.g. no new hazardous waste numbers were identified). However, AKSR CCP-AK-LANL-008 is currently under revision and will include information documented in this CCEM, including a more detailed description of packaging and packaging-related materials and chemicals.
<table>
<thead>
<tr>
<th>Chemical/Material</th>
<th>Use/Description/Location (AK Source Document)</th>
<th>Concentration¹</th>
<th>RGN Number</th>
<th>Chemical or Material Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum-based metal/alloys</td>
<td>Used as bracing and blocking during packaging. Constituent in source holders (cigar tubes) used initial containment of contaminated sources. Constituent in metal cans used to hold sources. Bracing, blocking, and packaging contribute to the majority of this chemical/material. Additionally, used to encapsulate sources. Used as a window in some sources. Constituent in foil sources (References C8016, C8086, C8078, C8079, C8080, C8083, C8084, D8005, D8023, D8031, M8012, M8025, M8026, M8033, M8041, M8042, M8046, M8047, M8091, M8343).</td>
<td>Dominant</td>
<td>23</td>
<td>This material is not present in this waste stream in powder, fine, vapor, or sponge form. See Technical Assumption #1, #2, #4, and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Cellulosics</td>
<td>Used as packing top or shim and as packaging damage external to the POCs. The cellulosics in this waste stream include cane fiberboard and plywood (References 1, C8016, C8084, and P8001).</td>
<td>Minor</td>
<td>101</td>
<td>Cellulosic material is only available to interact with surrounding metals and alloys of the POC, which are compatible. See Technical Assumption #3 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Iron-based metal/ alloys</td>
<td>Material used in the construction of SFCs, metal cans used to hold sources, and packaging. Steel is also used to encapsulate sources (References 1, C8016, C8078, C8084, D8002, D8005, D8006, D8010, D8011, D8012, D8014, D815, D822, D831, M8005, M8012, M8014, M8026, M8027, M8033, M8034, M8041, M8042, M8133, M8145, M8343, P8001).</td>
<td>Dominant</td>
<td>23</td>
<td>This material is not present in this waste stream in powder, fine, vapor, or sponge form. See Technical Assumption #1, #2, #4, and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Krytox LVP fluorinated grease</td>
<td>Used as lubricant during closure of special form capsules (References D8057, M8145). Constituents include perfluoropolyether and polytetrafluoroethylene.</td>
<td>Trace</td>
<td>101</td>
<td>Fluorinated grease is only available to interact with surrounding metals and alloys, which are compatible. See Technical Assumption #3 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Lead</td>
<td>Bracing and packaging material in some POC configurations for shielding (References 1, C8084, M8039, P8001).</td>
<td>Minor</td>
<td>23, 24</td>
<td>Lead is not available for reaction with materials inside an SFC. See Technical Assumption #1, #2, and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Lithium</td>
<td>Used as target material in neutron sources (References C8032, C8035, C8039, D8031, M8005).</td>
<td>Trace</td>
<td>21, 107</td>
<td>Lithium compounds are well-isolated and not available for reaction with other materials in the waste stream. See Technical Assumptions #1, #2, and #5 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Lithium Hydride</td>
<td>Used as target material in neutron sources. (References C8032, C8035, C8039, D8031, M8005).</td>
<td>Trace</td>
<td>105, 107</td>
<td>Lithium compounds are well-isolated and not available for reaction with other materials in the waste stream. See Technical Assumption #5 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Chemical/Material</td>
<td>Use/Description/Location (AK Source Document)</td>
<td>Concentration</td>
<td>RGN Number</td>
<td>Chemical or Material Evaluation</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
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<td>------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lithium Oxide</td>
<td>Used as target material in neutron sources. (References C8032, C8035, C8039, D8031, M8005).</td>
<td>Trace</td>
<td>107</td>
<td>Lithium oxide is assigned the RGN 107 to best represent the reactive properties of concern within waste stream LA-OS-00-01.001. This material is well-isolated and not available for reaction with other material in the waste stream. See Technical Assumption #5 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Plastics (Packaging)</td>
<td>Packaging material used as shield inserts in POCs as end shield plugs and side neutron shielding. Used as shield sleeve. Used as a rigid drum liner. (References 1, C8016, C8084, P8001). Plastics include high-density polyethylene, acrylic, polyvinyl chloride, and polyester.</td>
<td>Dominant</td>
<td>101</td>
<td>Plastics are only available to interact with surrounding metals and alloys which are compatible. See Technical Assumption #3 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Plastics (Waste)</td>
<td>Used as a source holder (bird feeder) in POC packaging. Used as a liner in caps of manufactured aluminum source holders. (References C8078, C8079, C8080, C8082, D8053). Plastics include acrylic and polyvinyl chloride polymers.</td>
<td>Trace</td>
<td>101</td>
<td>Plastics are only available to interact with surrounding metals and alloys which are compatible. See Technical Assumption #3 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Plutonium (Elemental)</td>
<td>Pyrophoric plutonium metal may be used during neutron source manufacturing. This metal is ball-milled with various target nuclei (i.e., lithium, beryllium, boron, carbon, oxygen, fluorine) (see Attachment 4 for these insignificant trace elements) and are doubly encapsulated (References C8004, D8023, D8025, M8026, M8026, M8091, M8145).</td>
<td>Trace</td>
<td>24, 107</td>
<td>Plutonium metal is well-isolated and not available for reaction with other materials in the waste stream. See Technical Assumption #5 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Polyurethane</td>
<td>Foam packaging material used as dunnage on outside of POCs (References 1, P8001).</td>
<td>Minor</td>
<td>101</td>
<td>Polyurethane is only available to interact with surrounding metals and alloys which are compatible. See Technical Assumption #3 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Resins (adhesives)</td>
<td>Used in the construction of acrylic source holders (bird feeder) and some sources. Resins include Hysol 9430 (Proprietary Epoxy Resin treated fumed silica, glass oxide) and Hysol R8-2038 (Epoxy Resin, N-butyl glycidyl ether) (References C8084, D8053, D8056).</td>
<td>Trace</td>
<td>101</td>
<td>These resins are the reacted final products and do not exhibit the reactivity associated with an uncured product; therefore RGN 101 is assigned. Resins are only available to interact with surrounding metals and alloys which are compatible. See Technical Assumption #3 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Chemical/Material</td>
<td>Use/Description/Location (AK Source Document)</td>
<td>Concentration</td>
<td>RGN Number</td>
<td>Chemical or Material Evaluation</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------</td>
<td>--------------</td>
<td>------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Rubbers</td>
<td>Gaskets and O-rings used for 55-gallon drum and standard POC closures (Reference 1). Rubbers include styrene-butadiene (SBR), neoprene rubber or equivalent, butyl rubber, and ethylene propylene (References 1, P8001).</td>
<td>Trace</td>
<td>101</td>
<td>Rubbers are only available to interact with surrounding metals and alloys which are compatible. See Technical Assumption #3 and Attachments 2 and 3.</td>
</tr>
<tr>
<td>Titanium</td>
<td>External component associated with some sources. Used as source encapsulation, coating, and window material (References D8005, M8046, M8114).</td>
<td>Minor</td>
<td>23, 24</td>
<td>Titanium does not exist in this waste stream in powder, vapor, or sponge form; therefore, RGN 22 does not apply. See Technical Assumption #1, #2, #4, and Attachments 2 and 3.</td>
</tr>
</tbody>
</table>

Note 1: Trace = less than 1 weight percent; Minor equals 1 to 10 weight percent; Dominant equals greater than 10 weight percent.
<table>
<thead>
<tr>
<th>RGN Number</th>
<th>Group Name</th>
<th>RGNS of Concern (Reaction Codes)</th>
<th>Evaluation of Potential Incompatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Metals, Alkali and Alkaline Earth, Elemental and Alloys</td>
<td>101(H,F,G), 107 (Extremely reactive)</td>
<td>Trace quantities of lithium are included in some sources within this waste stream. Any lithium included in this waste stream is encapsulated in at least one layer of other metal and placed into an SFC. Therefore, the highly isolated source material is not available to react with any materials of concern (RGN 101) located outside of the SFC. Refer to Technical Assumptions #1, #2 and #5.</td>
</tr>
<tr>
<td>23</td>
<td>Metals, Other Elemental, and Alloy, as Sheets, Rods, Moldings, Drops, etc.</td>
<td>107 (Extremely reactive)</td>
<td>Steels and alloys are included as part of the sealed sources within this waste stream. These materials were used as inner and outer capsules for the sealed source. These manufactured articles were fabricated to be inherently compatible with internal components. As such, the manufacturers do not manage these types of sources as reactive due to the robust isolation of these materials and therefore will not be conducive to an adverse reaction consequence. Refer to Technical Assumptions #1 and #5.</td>
</tr>
<tr>
<td>24</td>
<td>Metals and Metal Compounds, Toxic</td>
<td>107 (Extremely reactive)</td>
<td>Steels and alloys are included as part of the sealed sources within this waste stream. These materials were used as inner and outer capsules for the sealed source. These manufactured articles were fabricated to be inherently compatible with internal components. As such, the manufacturers do not manage these types of sources as reactive due to the robust isolation of these materials and therefore will not be conducive to an adverse reaction consequence. External metals and alloys will not be available for reaction with source material as established above. Refer to Technical Assumptions #1, #2 and #5.</td>
</tr>
<tr>
<td>101</td>
<td>Combustible and Flammable Materials, Miscellaneous</td>
<td>21(H,F,G), 105(H, GF), 107 (Extremely reactive)</td>
<td>The plastics, resins, rubber, and cellulosic materials within this waste stream are isolated from lithium containing source materials and under bounding waste managing circumstances are not available for reaction. Refer to Technical Assumptions #1, #2, and #5.</td>
</tr>
<tr>
<td>Reaction Code</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Explosion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Fire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Innocuous and Non-Flammable Gas Generation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GF</td>
<td>Flammable Gas Generation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GT</td>
<td>Toxic Gas Generation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Heat Generation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Violent Polymerization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Solubilization of Toxic Substances</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**105** Reducing Agents, Strong

| 101 (H, GF), 107 (Extremely Reactive | Lithium hydride may be present within some neutron sources. These sources are doubly encapsulated and isolated by at least one layer of confinement and placed into an SFC. Therefore, the highly isolated source material is not available to react with any materials of concern (RGN 101) located outside of the SFC. Refer to Technical Assumptions #1 and #5. |

**107** Water Reactive Substances

| Extremely reactive compounds. Potentially reactive with most compounds listed. In many cases much heat is generated along with toxic and/or flammable gases. | Trace quantities of lithium and plutonium are included in some sources. The source as a manufactured article is not reactive which is substantiated by the fact these manufacturers do not manage these types of sources as reactive. Therefore, RGN 107 is unavailable for reaction. Refer to Technical Assumptions #1, #2, and #5. |
### Reactivity Group Name

<table>
<thead>
<tr>
<th>Group</th>
<th>Reactivity Group Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Metals, Alkali and Alkaline Earth, Elemental</td>
</tr>
<tr>
<td>23</td>
<td>Metals, Other Elemental and Alloys, as Sheets, Rods, Drops, Moldings, etc.</td>
</tr>
<tr>
<td>24</td>
<td>Metals and Metal Compounds, Toxic</td>
</tr>
<tr>
<td>101</td>
<td>Combustible and Flammable Materials, Miscellaneous</td>
</tr>
<tr>
<td>105</td>
<td>Reducing Agents, Strong</td>
</tr>
<tr>
<td>107</td>
<td>Water Reactive Substances</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical/Material</th>
<th>Use/Description/Location (AK Source)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beryllium</td>
<td>Some sources include a brazed beryllium window. Beryllium is also used as a target material (References C8004, C8035, C8039, C8079, D8002, D8005, D8006, D8010, D8011, D8014, M8005, M8025, M8026, M8027, M8034, M8041, M8042, M8060, M8133, M8343).</td>
<td>#1</td>
</tr>
<tr>
<td>Boron</td>
<td>Target nuclei for neutron sources (References C8035, M8005, M8046, M8145)</td>
<td>#1</td>
</tr>
<tr>
<td>Cadmium</td>
<td>Material used in source encapsulation (References M8058, M8062).</td>
<td>#1</td>
</tr>
<tr>
<td>Carbon</td>
<td>Target nuclei for neutron sources (References C8035, M8145).</td>
<td>#1</td>
</tr>
<tr>
<td>Ceramic</td>
<td>Component associated with some sources (i.e., Si-Na-Mg oxide) (References D8002, D8005, D8008, D8010, D8012, M8005, M8046, M8145).</td>
<td>#1</td>
</tr>
<tr>
<td>Ceralloy</td>
<td>Source manufacturing material. A C400 silicon-carbide proprietary blend (Reference M8046).</td>
<td>#1</td>
</tr>
<tr>
<td>Cesium Chloride</td>
<td>Gamma emitting salt used in manufacturing of some sources (Reference C8035).</td>
<td>#1, #3</td>
</tr>
<tr>
<td>Chromium</td>
<td>Material used in source encapsulation (References D8002, D8006, M8033, M8046).</td>
<td>#1</td>
</tr>
<tr>
<td>Copper</td>
<td>Material used in source encapsulation (References D8005, D8010, M8005, M8046, M8058, M8062).</td>
<td>#1</td>
</tr>
<tr>
<td>E-glass</td>
<td>External component associated with some sources (Reference M8046). Constituents include silicone dioxide, calcium oxide, aluminum oxide, and boron oxide.</td>
<td>#1</td>
</tr>
<tr>
<td>Fluorine</td>
<td>Target nuclei for neutron sources (References C8035, M8005, M8145).</td>
<td>#1</td>
</tr>
<tr>
<td>Glass</td>
<td>Used in manufacturing of source material (i.e., aluminosilicate) (References C8035, M8005, M8033, M8145).</td>
<td>#1</td>
</tr>
<tr>
<td>Gold</td>
<td>Material used in source encapsulation (References D8005, D8010, M8012, M8042, M8343).</td>
<td>#1</td>
</tr>
<tr>
<td>Iridium</td>
<td>Material used in source encapsulation (Reference D8005).</td>
<td>#1</td>
</tr>
<tr>
<td>Chemical/Material</td>
<td>Use/Description/Location (AK Source)</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Lithium hydroxide</td>
<td>Potentially used as target material in neutron sources (References C8032, C8035, C8039, D8031, M8005).</td>
<td>#1</td>
</tr>
<tr>
<td>Manganese</td>
<td>Material used in source encapsulation (References D8002, M8046, M8133).</td>
<td>#1</td>
</tr>
<tr>
<td>Nickel</td>
<td>Material used in source encapsulation (References C8060, D8002, M8012, M8033, M8042, M8046, M8047).</td>
<td>#1</td>
</tr>
<tr>
<td>Oxygen</td>
<td>Target nuclei for neutron sources (References C8035, M8048).</td>
<td>#1</td>
</tr>
<tr>
<td>Palladium</td>
<td>Material used in source encapsulation (References D8010, M8343).</td>
<td>#1</td>
</tr>
<tr>
<td>Platinum</td>
<td>Material used in source encapsulation (References D8005, M8012, M8042, M8046).</td>
<td>#1</td>
</tr>
<tr>
<td>Silver</td>
<td>Material used in source encapsulation (References D8002, D8010, M8033, M8343).</td>
<td>#1</td>
</tr>
<tr>
<td>Rhodium</td>
<td>Material used in source encapsulation (Reference C8060).</td>
<td>#1</td>
</tr>
<tr>
<td>Tantalum</td>
<td>Material used in source encapsulation (References C8080, D8005, D8008, D8011, D8014, M8012, M8025, M8026, M8033, M8041, M8048).</td>
<td>#1</td>
</tr>
<tr>
<td>Tungsten</td>
<td>Material used in source encapsulation (References D8005, D8010, D8012, D8031, M8005, M8012, M8014, M8046, M8133, M8343).</td>
<td>#1</td>
</tr>
<tr>
<td>Transuranic Sealed Source Material</td>
<td>The sealed source material consists of transuranic actinides (i.e. plutonium, americium) as metal, oxides, or chlorides. Elemental plutonium is discussed in Attachment 1. In addition, sources contain transuranic actinides combined with Ce-137; see Cesium Chloride (References C8004, C8039 C8080, C8079, D8002, D8005, D8006, D8010, D8011, D8012, D8014, D8016, D8031, M8005, M8012, M8018, M8025, M8026, M8027, M8034, M8041, M8042, M8046, M8058, M8060, M8062, M8133, M8145, M8343, P8007).</td>
<td>#1, #3</td>
</tr>
<tr>
<td>Chemical/Material</td>
<td>Use/Description/Location (AK Source)</td>
<td>Notes</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Volatile Organic Compounds (VOCs)</td>
<td>Detected in some headspace gas (HSG) samples taken from empty POCs and are associated with packaging materials (i.e., Acetone, Benzene, Bromoform, Butanol, Carbon Tetrachloride, Chlorobenzene, Chloroform, Chloromethane, Cyclohexane, 1, 1-Dichloroethane, 1, 2-Dichloroethane, 1, 1-Dichloroethylene, cis-1, 2-Dichloroethylene, trans-1, 2-Dichloroethylene, Ethyl Benzene, Ethyl Ether, Methanol, Methyl ethyl ketone, Methyl isobutyl ketone, Methylene Chloride, 1, 1, 2, 2-Tetrachloroethane, Tetrachloroethylene, Toluene, 1, 1, 1-Trichloroethane, Trichloroethylene, 1, 1, 2-Trichloro-1, 2, 2-trifluoroethane, 1, 3, 5-Trimethylbenzene, 1, 2, 4-Trimethylbenzene, p/m-Xylene, o-Xylene, Hydrogen. Methane) (References D8001, M8002).</td>
<td>#1, #4</td>
</tr>
</tbody>
</table>

Notes

1. Trace (<1%) material resulting in insignificant waste contamination.
2. Transuranic source material may include elemental plutonium. See Technical Assumptions.
3. These VOCs are not associated with the waste. The presence of these VOCs are a result of off-gassing of packaging materials and would only be present below Program Quantitation Limits.
<table>
<thead>
<tr>
<th>Ref.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref. 1</td>
<td>CCP-PO-003, CCP Transuranic Authorized Methods for Payload Control (CCP CH-TRAMPAC), Carlsbad, New Mexico, Washington TRU Solutions, LLC</td>
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<tr>
<td>Ref. 2</td>
<td>CCP Waste Stream Profile Form for LA-OS-00-04</td>
</tr>
<tr>
<td>C8004</td>
<td>Memos and Other Documentation Supporting Pu-239 Defense Relationship</td>
</tr>
<tr>
<td>C8016</td>
<td>Memos re: POC Packaging Practices for Sealed Source Waste</td>
</tr>
<tr>
<td>C8032</td>
<td>OSRP Correspondence on Lithium Sources are non-reactive and confirmation to be added into Waste Stream LA-OS-00-01.001</td>
</tr>
<tr>
<td>C8035</td>
<td>Waste Stream # LA-OS-00-01.001 Characterization of Sources Containing “Other Light Metals”</td>
</tr>
<tr>
<td>C8039</td>
<td>OSRP email requests for drums characterized between April 2009 to February 2010 to be added to the LANL AK tracking spreadsheet</td>
</tr>
<tr>
<td>C8060</td>
<td>Engineering Evaluation of Nuclear Powered Pacemakers as Special Form Radioactive Material</td>
</tr>
<tr>
<td>C8066</td>
<td>Interview of Jim Matzkey and Jerry McAlpin by AKE Lisa Watson regarding Method for Handling Leaking Sealed Sources</td>
</tr>
<tr>
<td>C8078</td>
<td>Memorandum: Types and Composition of OSRP Packaging Receptacles Used to minimize Personnel Exposure When Packaging LA-OS-00-01.001, LA-OS-00-03 and LA-OS-00-04 Sources for WIPP</td>
</tr>
<tr>
<td>C8079</td>
<td>Interview of OSRP Personnel by Christina Poulos and Jason Montoya; Subject: Record of Communication re: Clarification on sealed sources and packaging configuration for LA-OS-00-01.001</td>
</tr>
<tr>
<td>C8080</td>
<td>Email from Alex Feldman to Christina Poulos re: Aluminum Can Lid Used in Packaging of Sealed Sources</td>
</tr>
<tr>
<td>C8082</td>
<td>Email from Alex Feldman to Christina Poulos re: Birdfeeders Fabrication Material</td>
</tr>
<tr>
<td>C8083</td>
<td>Email from Alex Feldman to Christina Poulos re: Venting of Metal Cans</td>
</tr>
<tr>
<td>C8084</td>
<td>Memorandum: Types and Composition of Dunnage and Engineered Bracing Materials Used in WIPP Approved 12 inch POC Shipments to WIPP</td>
</tr>
<tr>
<td>C8086</td>
<td>Radioactive Swipes</td>
</tr>
<tr>
<td>D8001</td>
<td>Headspace Gas Sampling and Analysis Evaluation for LANL Sealed Sources</td>
</tr>
<tr>
<td>D8002</td>
<td>RCRA Designation of Discarded Americium/Beryllium Sealed Sources</td>
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<tr>
<td>D8005</td>
<td>Summary of Sealed Source Types, OSR Project</td>
</tr>
<tr>
<td>D8006</td>
<td>Encapsulation and Source Activities of Alpha-n Neutron Sources</td>
</tr>
<tr>
<td>D8010</td>
<td>Amersham Source Catalogue, Manufacturer Data</td>
</tr>
<tr>
<td>D8011</td>
<td>Special Form Documentation for AmBe and PuBe Neutron Test Sources (UCNI)</td>
</tr>
<tr>
<td>D8012</td>
<td>Engineering Evaluation of New England Nuclear Model NER-478C Sealed Sources as Special Form Radioactive Material</td>
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<tr>
<td>D8014</td>
<td>Inspection and Recanning Program of PuBe Neutron Sources</td>
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<td>Reference</td>
<td>Description</td>
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<td>-------------</td>
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<tr>
<td>D8015</td>
<td>Characterization of Actinide-Bearing Sealed Sources by Acceptable Knowledge - Justification and Methods</td>
</tr>
<tr>
<td>D8022</td>
<td>Test Report for Los Alamos National Laboratory on 3&quot; Special Form Radioactive Material Capsules</td>
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<tr>
<td>D8023</td>
<td>WIPP Eligibility Determination of U.S. Army Research Laboratory Pu-239 Fission Foils</td>
</tr>
<tr>
<td>D8025</td>
<td>Transuranic Waste Defense Determination Approval Forms</td>
</tr>
<tr>
<td>D8031</td>
<td>Waste Determination of Encapsulated Radioactive Sources Containing Small Quantities of Lithium</td>
</tr>
<tr>
<td>D8053</td>
<td>Source Holder for 6&quot; POC (Large Assembly)</td>
</tr>
<tr>
<td>D8056</td>
<td>SDS for LOCTITE EA 9430 A RESIN known as HYSOL 9430 1QT KT RESIN</td>
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<tr>
<td>D8057</td>
<td>SDS for Krytox® PFPE/PTFE Greases (GPL 20(X) Series)</td>
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<tr>
<td>M8002</td>
<td>Batch Data Report Number LA02-HGAS/IA-006 for Headspace Gas Analysis to Determine OSR Packaging Source Term</td>
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<td>M8005</td>
<td>Query of &quot;Registry of Radioactive Sealed Sources and Devices,&quot; MAY 21, 1982</td>
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<tr>
<td>M8012</td>
<td>Sealed Source Drawings</td>
</tr>
<tr>
<td>M8014</td>
<td>Welding Test Records</td>
</tr>
<tr>
<td>M8018</td>
<td>Memo to S. Leonard re: Examples of NRC Form 741 for the ARCO Nuclear Pacemakers</td>
</tr>
<tr>
<td>M8025</td>
<td>Manufacturer's Data for LLNL Sources (LLNL - MRC-Pu-Be-8-1, MRC - PuBe-8-7, MRC - PuBe-8-15, MRC-PuBe-8-9, MRC-Pu8Be-28, MRC-PuBe-28)</td>
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<tr>
<td>M8026</td>
<td>Pu-239/Be Sealed Source Supporting Documentation</td>
</tr>
<tr>
<td>M8027</td>
<td>Manufacturer Data for Monsanto Sources at Knolls Atomic Power Lab</td>
</tr>
<tr>
<td>M8033</td>
<td>LANL Waste Profile Form #32779</td>
</tr>
<tr>
<td>M8034</td>
<td>Special Form Certificates</td>
</tr>
<tr>
<td>M8039</td>
<td>Regulatory Information on the Status of Lead used as Shielding in Waste Containers</td>
</tr>
<tr>
<td>M8041</td>
<td>NUMEC Plutonium-Beryllium Neutron Sources Catalog</td>
</tr>
<tr>
<td>M8042</td>
<td>Monsanto Radioactive Source Catalog</td>
</tr>
<tr>
<td>M8046</td>
<td>ARCO Nuclear Technical Document, 039274</td>
</tr>
<tr>
<td>M8047</td>
<td>General Atomic QA Data on PuN Capsules</td>
</tr>
<tr>
<td>M8058</td>
<td>Shipping Data Form for Sources MRC-TD-Pu-228 through -254</td>
</tr>
<tr>
<td>M8060</td>
<td>Analysis for Beryllium Weight Percent for Waste Stream LA-OS-00-01</td>
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<tr>
<td>M8062</td>
<td>Calculation of Cadmium Weight Percent in Drum 61603</td>
</tr>
<tr>
<td>M8091</td>
<td>Brookhaven; Foils #1,2,3,4, 9649, 6286LA; S1828; Shipping record and NMMIS record</td>
</tr>
<tr>
<td>M8114</td>
<td>Amersham Catalog</td>
</tr>
<tr>
<td>M8133</td>
<td>Characterization of Am-241/Be/Cs-137 Combination Sources</td>
</tr>
<tr>
<td>Reference</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
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<tr>
<td>M8145</td>
<td>IAEA Certificates of Competent Authority Special Form Radioactive Materials Certificate Numbers USA/0696/S-96 and USA/0695/S-96</td>
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<tr>
<td>M8327</td>
<td>AK Documentation for VE BDR LA14-OSR-VE-014 and Characterization BDR LA14-OSR-CH-014, Drums LA000000062757, LA00000065480, LA00000067558</td>
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<tr>
<td>M8343</td>
<td>Source Manufacturer Catalogues</td>
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<tr>
<td>P8001</td>
<td>CCP Sealed Source Visual Examination and Packaging</td>
</tr>
<tr>
<td>P8007</td>
<td>NRD Shipping File</td>
</tr>
</tbody>
</table>
CBFO Form 4.15-3
Currently Certified Waste Checklist #2

Fabian Ybarra, CCP Document Services Technical Editor email dated October 31, 2017
Hello,

Please find attached for CBFO review the Basis of Knowledge Evaluation for Waste Stream LA-OS-00-01.001.

Thank you,

**Fabian Ybarra**
CCP Document Services/Technical Editor
T.F.E. Inc.
Contractor to Nuclear Waste Partnership LLC
(575) 234-7164
To: Carolina Soaterma, Site Project Manager, LANL

From: Trey Greenwood, Acceptable Knowledge Expert

Date: October 31, 2017

Subject: Basis of Knowledge Evaluation for Waste Stream LA-OS-00-01.001

The purpose of this memo is to satisfy the requirements of CCP-TP-005, CCP Acceptable Knowledge Documentation, Section 4.16 “Basis of Knowledge (BoK) Evaluation,” which requires a Basis of Knowledge evaluation to assess the potential for oxidizing chemicals in a waste stream for all current containers in waste stream LA-OS-00-01.001. This waste stream is described in CCP-AK-LANL-008, Central Characterization Project Acceptable Knowledge Summary Report for Los Alamos National Laboratory Off-Site Source Recovery Project Sealed Sources, Waste Streams LA-OS-00-01.001, LA-OS-00-03, and LA-OS-00-04.

Based on the chemical compatibility evaluation (AK source document CCE8001) completed for this waste stream it has been determined there are no oxidizing chemicals in waste stream LA-OS-00-01.001. Therefore, in accordance with the DOE/WIPP-17-3589, Basis of Knowledge for Evaluating Oxidizing Chemicals in TRU Waste, Revision 0, this waste stream is not subject to the BoK and does not require an additional evaluation for treatment. This waste stream is acceptable for disposal at WIPP as-is.

If you require additional information, please do not hesitate to contact me.
CBFO Form 4.15-3
Currently Certified Waste
Checklist #4

CBFO Memorandum
CBFO:ONTP:NOD:JRS:17-2364:UFC
5822.00

Issue and Implementation of
DOE/WIPP 01-3194, Rev 58, CH-
TRU Waste Content Codes
(CH-TRUCON)
DATE: NOV 06 2017
REPLY TO ATT OF: CBFO:ONTP:NOD:JRS:17-2364:UFC 5822.00
SUBJECT: Issue and Implementation of DOE/WIPP 01-3194, Revision 58, CH-TRU Waste Content Codes (CH-TRUCON)

TO: Todd Sellmer, NWP Manager, Transportation Packaging

The Carlsbad Field Office has revised the DOE/WIPP 01-3194, CH-TRU Waste Content Codes (CH-TRUCON) document with the implementation date of November 6, 2017 and the Revision 57 to be superseded on November 6, 2017. This revision incorporates the following specific revisions:

- The chemical list for CH-TRUCON Code LA 116/216 has been revised for consistency with the chemical content documented in Attachment 1 of the Memorandum from J.M. Schoen to D. Wade, RE: Chemical Compatibility Evaluation for Waste Stream LA-MHD01.001 Full Waste Stream (AK Source Document CCE001), dated February 6, 2017.

- The chemical list for CH-TRUCON Code LA 120/220 has been revised for consistency with the chemical content documented in Attachment 1 of the Memorandum from J. Montoya to D. Wade, RE: Chemical Compatibility Evaluation for Waste Stream LA-OS-00-01.001, dated October 26, 2017.

- Revised chemical lists for CH-TRUCON Codes LA 116/216 and LA 120/220 have been deleted from Appendix A and added to Appendix C.

- The Waste Form section of LA 120/220 has been revised to clarify that the LA-OS-00-01.001 waste is solid inorganic waste packaged in metal as the innermost layer of confinement such that there is no gas generation potential. While trace concentrations of plastic materials may be present in source holders, the Waste Stream LA-OS-00-01.001 sources are encapsulated in various metals and alloys. The confining barrier ensures containment of the radioactive source material.

- New packaging configuration ID 112/212Z has been added to CH-TRUCON Code ID 112/212 for Waste Stream ID-RF-S3114 described in CCP-AK-INL-005, CCP AK Summary Report for Rocky Flats Immobilized Organic Liquids Stored at the INL, Waste Streams: ID-RF-S3114 and ID-RF-S3150-A, Revision 8. The new packaging configuration describes 55-gallon drums that have been overpacked in 85-gallon drums.
The Government Information Specialist from the Office of Business Operations will notify your office when the document is available for posting on the National TRU Programs Controlled Documents webpage http://www.wipp.energy.gov/NTPXport. Users are required to submit revised implementation procedures to site.documents@wipp.ws.

If you have any questions, please contact J. R. Stroble at (575) 234-7313.

Sincerely,

Jeffrey Carswell  
Senior Technical Safety Manager  
Compliance Division

J.R. Stroble, Director  
National TRU Program

cc:  
M. Brown, CBFO  * ED  
M. Gee, CBFO  ED  
W. Mackie, CBFO  ED  
D. Miehls, CBFO  ED  
D. Standiford, CBFO  ED  
A. Walker, CBFO  ED  
M. Pearcy, NWP  ED  
R. Lee, NWP  ED  
M. Ramirez, NWP  ED  
L. Burns, NWP  ED  
J. Biedscheid, NWP  ED  
M. Devarakonda, NWP  ED  
D. Staber, NWP  ED  
CBFO M&RC  
*ED denotes electronic distribution
CH-TRU WASTE CONTENT CODES (CH-TRUCON)

Revision 58
November 6, 2017

Approved by: J. R. Stroble, Director, NTP Compliance Division

Date: 11-6-17
CBFO Form 4.15-3
Currently Certified Waste
Checklist #5, 7, 8.

CBFO Surveillances:
S-17-07, Nuclear Waste Partnership LLC
Waste Data System

S-17-32, Readiness to Remove "Read Only' Controls from WDS

S-17-34, Transportation Authorization for the LANL CCP Transuranic Waste Stored at (WCS)
Ms. Mary McDaniel, Manager  
Quality and Contractor Assurance  
Nuclear Waste Partnership LLC  
P.O. Box 2078  
Carlsbad, NM 88221-2078

Subject: Surveillance Report S-17-07, Nuclear Waste Partnership LLC Waste Data System

Dear Ms. McDaniel:

A surveillance team from the Carlsbad Field Office (CBFO) conducted Surveillance S-17-07 of the Nuclear Waste Partnership LLC (NWP) Waste Data System (WDS). The surveillance was conducted February 21 – 28, 2017, in Carlsbad, NM. The team concluded that the NWP program requirements and associated implementing procedures for the WDS are satisfactorily implemented and effective. Further, the reclassification of the WDS as safety software and the application of software quality assurance controls as applied by NWP to the maintenance of WDS are also satisfactory and effective.

One condition adverse to quality (CAQ) was identified during the surveillance. The CAQ was related to the identification and capture of records that provide evidence of justification for changes made to reference tables in the WDS. The CAQ resulted in the issuance of CAR 17-026.

If you have any questions concerning the surveillance, please contact me at (575) 234-7491.

Sincerely,

Dennis S. Miehls  
Senior Quality Assurance Specialist

Enclosure

cc: w/enclosure  
M. Brown, CBFO  
M. Navarrete, CBFO  
J.R. Stroble, CBFO  
D. Standiford, CBFO  
J. Britain, NWP  
V. Ballew, NWP  
S. Punchios, NWP  
A. Boyea, NWP  
J. Walsh, EPA  
J. Ellis, EPA  
T. Peake, EPA  
J. Kieling, NMED  

R. Maestas, NMED  
D. Biswell, NMED  
P. Martinez, CTAC  
C. Castillo, CTAC  
M. Lerch, CTAC  
J. Vernon, CTAC  
B. Tousley, CTAC  
D. Harvill, CTAC  
G. White, CTAC  
CBFO QA File  
CBFO M&RC  

*ED denotes electronic distribution
CBFO SURVEILLANCE REPORT

Surveillance Number: S-17-07  Date of Surveillance: February 21 – 28, 2017

Surveillance Title: NWP Waste Data System

Organization: Nuclear Waste Partnership LLC (NWP)

Surveillance Team:

Dennis S. Miehls  Quality Assurance Representative, Carlsbad Field Office (CBFO), Office of Quality Assurance
Martin Fineran  CBFO Quality Assurance
Jim Vemon  Surveillance Team Leader, CBFO Technical Assistance Contractor (CTAC)
Briant Tousley  Surveillance Team Leader-In-training, CTAC
Kathy Hood  Team Member, CTAC
Jim Schuetz  Team Member, CTAC

Surveillance Scope:

The surveillance evaluated the implementation and effectiveness of the NWP program requirements and associated implementing procedures for the Waste Data System (WDS). The surveillance also evaluated any changes to the WDS based on the recent revision of DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC), and the reclassification of the WDS as safety software.

The surveillance team evaluated implementation and effectiveness of software quality assurance (SQA) controls applied by NWP to the maintenance of the WDS. WDS is a web-based software application that incorporates elements of the Waste Isolation Pilot Plant (WIPP) Waste Information System (WWIS) software application.

Results:

Activities Evaluated

The surveillance team interviewed NWP Waste Information Tracking System (WITS) personnel and reviewed SQA documents regarding the WWIS/WDS web-based data management application. The surveillance team assessed management of software changes and data management activities performed by the software programming contractor and by Database Administrator (DBA) and WITS personnel.

Application of SQA to changes to the WWIS/WDS code and data were evaluated. Requests for changes to code modules, generation of statements of work for contractor programming, software design, software requirements, testing, test reporting, and promotion of code changes to the production environment were included in the
evaluation of SQA activities. WDS release number 2.7.3, on January 24, 2017, implemented the documented safety analysis (DSA) 18.8 required checks as a permanent modification to the WDS. Specifically, Chemical Compatibility, Acceptable Knowledge Assessment, Integrated Waste Management Document Lists, and statistical Material at Risk evaluations have been implemented. Basis of Knowledge evaluation prior to shipment is controlled by procedure WP 08-NT3021, Approval of Shipments in the Waste Data System. Currently the WDS DBA's perform manual checks of the Basis of Knowledge that will be automated in the WDS in 2.8.1. The CCP Site Project Managers also check for all of the enhanced AK elements manually using CCP-TP-200 Chemical Compatibility Evaluation Memorandum and Acceptable Knowledge Assessment Review. DOE/WIPP 07-3372, WIPP Documented Safety Analysis, Rev. 5, Review and approval of requests for data changes and modification of data and data tables contained in the WWIS/WDS were included in the evaluation of maintenance and control of administrative reference tables.

The CBFO Quality Assurance Program Document (QAPD), DOE/CBFO-94-1012, Rev. 12, is used as the upper-tier reference document stating SQA requirements for this activity. The following NWP documents were evaluated during the surveillance:

- WP 08-NT.01, Rev. 32, Waste Data System Program and Data Management Plan
- WP 08-NT.04, Rev. 24, Waste Data System Software Quality Assurance Plan
- WP 08-NT1004, Rev. 4, Waste Data System Verification, Validation, and Deployment of Application Software

The team reviewed NWP controlling documents, procedures, and WWIS/WDS user manuals for compliance with requirements of the upper-tier documents and WP 13-1, NWP Quality Assurance Program Description. The surveillance team determined that the documents listed above provide adequate flow-down of upper-tier requirements and provide adequate guidance and work steps for users to apply SQA to management of the WWIS/WDS.

The surveillance team reviewed NWP WDS controlling documents for compliance to upper-tier documents CBFO QAPD, Rev. 12, and DOE/WIPP-08-3427, WDS User's Manual, Rev. 14. Additional NWP documents reviewed were:

- WP 05-WH.02, Rev. 2, WIPP Waste Handling Operations WDS User's Manual
- WP 08-NT.15, Rev. 8, WDS Maintenance of Administrative Reference Tables
- WP 08-NT1002, Rev. 5, WDS Administrative Reference Tables

Documentation reviews and personnel interviews were conducted during the course of the surveillance evaluating the maintenance and control of administrative reference tables contained in the WDS. The team verified training qualifications for the Data Administrators (DAs) are current. Further evaluations of the WDS and interviews with the DAs concluded the Reference Data Change Log is properly maintained as required. The Reference Data Change Log is maintained electronically and can be produced in hard copy format upon request. Roles and responsibilities of administrative reference tables are maintained and controlled by way of limiting access, function, and control to specific personnel within the WDS system.
The surveillance team verified the quality assurance (QA) functions that apply to maintenance of administrative reference tables are incorporated into the WDS system, and personnel are performing these functions per procedural requirements.

In reviewing WP 08-NT1002, Rev. 5, WDS Administrative Reference Tables, the surveillance team identified one concern. Various steps in the procedure associate with instructions and notifications through email correspondence. The surveillance team observed that justification for changes to reference tables is briefly stated in fields in the WDS Reference Data Change Log with details being provided in the email correspondence. The WDS Reference Data Change Log is listed as a record in the procedure; however, email correspondence that provides full details of change justification is not. Further, a review of the current WDS Records Inventory and Disposition Schedule (RIDS) determined it did not list email correspondence. The surveillance team concluded a condition adverse to quality existed concerning identification and capture of records (see CAR 17-026).

With the exception of the condition adverse to quality documented in CAR 17-026, the surveillance team concluded that the established QA program for WDS-related activities is compliant with upper-tier requirements and that associated implementing procedures were determined to be satisfactorily implemented and effective.

Program Adequacy, Implementation, and Effectiveness

The software contractor, Information System Laboratories, Inc. (ISL), performs code modifications and provides SQA and configuration control of all aspects and modules of the WWIS/WDS under the direction of NWP WITS. NWP WITS performs acceptance and installation testing of all ISL code changes prior to deployment. User testing is performed by selected users as determined necessary by the NWP senior engineer based on the scope of a code change and following a user test plan. WITS personnel utilize Approval Request/Variation Request forms for documentation of review and approvals of contractor deliverables that are generated per the change scope.

The surveillance team determined that NWP adequately identifies, reviews, and approves change requirements to the WWIS/WDS. ISL adequately translates software requirements into design, implements code, and generates SQA life-cycle documents. NWP and ISL utilize a web-based software management application called "Matrix" to track each change through the requirements, design, code modification, testing, and approval phases, including change and management of impacted life-cycle documents. The "Matrix" code and data are maintained by ISL under the approved ISL SQA program. The surveillance team reviewed implementation of SQA to WWIS/WDS version 6.1 and determined that changes were reviewed and approved and that code was modified, tested, and installed in accordance with procedures.

Testing of changes using defined test cases and the Automated Testing Tool (ATT) are adequately performed and documented in test reports based on implementation of approved test plans. The senior engineer determines if and how the ATT function will be implemented for changes. The ATT is maintained by ISL under the approved ISL SQA program.
NWP manages data within the WDS software application and implements the Data Change process. The surveillance team determined that WITS personnel adequately review, approve, perform, and document changes made to data for the WDS.

The surveillance team determined that NWP SQA procedures are adequate and that implementation of these procedures is satisfactory and provides for an effective application of SQA to maintenance, control, and use of the WWIS/WDS.

Corrective Actions:

**Corrective Action Reports/Deficiencies Corrected During the Surveillance**

One deficiency related to identification and capture of records that provide evidence of justification for changes made to reference tables was identified during this surveillance.

WP 08-NT1002, Rev. 5, *WDS Administrative Reference Tables*, provides instructions for the maintenance of reference data in the WDS by DAs, DBAs, and other authorized users. Throughout the procedure, DAs, DBAs, and authorized users perform steps in the procedure based on direction/requests from email correspondence. Justification for changes to reference tables is briefly stated in fields in the log with details being provided in the email correspondence. Changes to the WDS Administrative Reference Tables are documented in WDS and are reported in the WDS Reference Data Change Log report. None of the DAs interviewed during the surveillance were able to produce emails that provided justification for changes that were performed. The WDS Reference Data Change Log is specified/listed as a record in the procedure; however, email correspondence is not.

Email correspondence that provides justification and details for changes to WDS reference tables must be specified/listed on the RIDS and captured as a record for compliance with WP 13-1, *Quality Assurance Program Description*, regarding identification and capture of QA records related to site characterization data and data of mixed transuranic (TRU) waste form characterization and acceptance of the mixed TRU waste form. CBFO CAR 17-026 was generated as a result of this concern.

**Observations**

No Observations were made as a result of the surveillance.

**Recommendations**

No Recommendations were offered for management consideration as a result of the surveillance.

Surveillance Team Leader: Jim Vernon, CTAC  
Date: 3-29-17

Director CBFO OQA Approval: Dennis S. Miehls  
Date: 3-29-17
DATE: MAR 3 1 2017

REPLY TO ATTN OF: CBFO:OQA:MRB:BA:17-1104:UFC 2300.00

SUBJECT: Issuance of Report for Surveillance S-17-32, Readiness to Remove "Read Only" Controls from WDS

TO: Mr. J.R. Stroble, Director, National TRU Program Compliance Division

The Carlsbad Field Office (CBFO) conducted Surveillance S-17-32, Readiness to Remove "Read Only" Controls from the Waste Data System (WDS), to verify that all of the requirements of DOE/WIPP 07-3372, Revision 6b, Waste Isolation Pilot Plant Documented Safety Analysis (DSA), section 18.8, have been implemented. The surveillance was performed on March 21 – 31, 2017. The surveillance report is attached.

The surveillance team concluded that all of the DSA section 18.8 requirements have been met and that the "Read Only" function of the WDS can be removed so that the resumption of shipments to the Waste Isolation Pilot Plant using previously certified waste from waste streams ID-RF-S3114 and SR-221H-PuOx can occur.

If you have any questions concerning the surveillance report, please contact me at (575) 234-7476.

Michael R. Brown, Director
Office of Quality Assurance

Attachment

cc: w/attachment
T. Shrader, CBFO *ED
J. Carswell, CBFO ED
D. Miehs, CBFO ED
M. Navarrete, CBFO ED
M. Finerman, CBFO ED
M. Stapleton, CBFO ED
C. Fesmire, CBFO ED
D. Standford, CBFO ED
V. Daub, CTAC ED
P. Martinez, CTAC ED
C. Castillo, CTAC ED
M. Lano, CTAC ED
J. Vernon, CTAC ED
P. Yanez, CTAC ED
G. Knox, CTAC ED
D. Harvell, CTAC ED
G. White, CTAC ED
CBFO QA File
CBFO M&RC
*ED denotes electronic distribution
CBFO SURVEILLANCE REPORT

Surveillance Number: S-17-32  Date of Surveillance: March 21 – 31, 2017

Surveillance Title: Readiness to Remove Read Only Controls from WDS

Organization: Carlsbad Field Office (CBFO) - Nuclear Waste Partnership LLC (NWP)

Surveillance Team: ¹

Dennis S. Miehis  Quality Assurance Representative, CBFO Office of Quality Assurance
Martin Navarrete  CBFO Quality Assurance
Jim Vernon  Surveillance Team Leader, CBFO Technical Assistance Contractor (CTAC), ASME NQA-1 Lead Auditor
Jim Schuetz  Team Member, Technical Specialist, CTAC – Software Quality Assurance
Greg Knox  Team Member, CTAC – Quality Assurance
Prissy Yanez  Team Member, CTAC – Quality Assurance
Dick Blauvelt  Team Member, Technical Specialist, CTAC – Acceptable Knowledge
Randy Fitzgerald  Team Member, Technical Specialist, CTAC – Acceptable Knowledge
Ricardo Chavez  Team Member, CTAC – Quality Assurance

Surveillance Scope:

In accordance with DOE/WIPP 07-3372, Revision 5b, Waste Isolation Pilot Plant Documented Safety Analysis (DSA), section 14.6.5, an independent assessment was conducted by CBFO Quality Assurance. This independent assessment is a smaller assessment of a specific activity; therefore surveillance S-17-32 was conducted.

The surveillance evaluated the Waste Data System (WDS) controls established to meet the DSA, section 18.8, Previously Certified Waste Preclusion of Shipments requirements, particularly the requirement for removal of the temporary “Read Only” control in WDS.

Results:

¹ All of the team members and technical specialists are ASME NQA-1 certified.
Activities Evaluated

The DSA, section 18.8, describes several actions that will occur concerning waste certified prior to the implementation of revision 5b of the DSA. The actions identified in section 18.8 are based on DOE/WIPP-02-3122, Revision 8, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Appendix I – Previously Certified Waste Preclusion of Shipments. The verbatim DSA section 18.8 requirements and the evaluation of each requirement by the surveillance team are outlined below.

Requirement:

All payloads previously virtually built in the payload module of WDS have been removed.

The surveillance team reviewed CBFO memorandum CBFO:ONTP:CF:BA:17-0616:UFC 2300.00. The memorandum included the WDS Data Change Request (DCR) number 16:005, dated February 29, 2016, requesting that all shipments, payloads, associated payload plans, and associated assemblies in WDS that have not been sent to WIPP be placed on hold regarding promotion within the database. The surveillance team also reviewed the associated letters from NWP (dated February 19, 2016) and CBFO (dated February 25, 2016) concerning removal of all existing payloads currently built in the WDS, and the associated letter from the CBFO Contracting Officer (dated February 11, 2016) directing NWP to place all currently certified transuranic (TRU) waste containers in the “Holding Cert” category in the WDS, with the exception of certified waste from shipping site Idaho National Laboratory.

Requirement:

The packaging table in WDS has been coded as read only. This will prevent any new payloads from being finalized in WDS application. This is a temporary measure in place until a permanent modification to the WDS is implemented to delineate all the checks listed in the section below. The packaging table in WDS will be turned back on to allow for payloads to be built for final approval.

The surveillance team reviewed CBFO memorandum CBFO:ONTP:CF:BA:17-0616:UFC 2300.00. The memorandum included the WDS DCR number 16:005, dated February 29, 2016, requesting read/write permissions on the WDS Packaging table to be set to “Read Only.”

Requirement:

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.

See CBFO Surveillance S-17-30 and CBFO Surveillance S-17-31.
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.

See CBFO Surveillance S-17-30 and CBFO Surveillance S-17-31.

CBFO will concur with enhanced chemical compatibility evaluation and implementation of the Basis of Knowledge for the evaluated waste stream.

See CBFO Surveillance S-17-30 and CBFO Surveillance S-17-31.

CBFO will approve waste streams with acceptable enhanced chemical compatibility evaluation documentation provided by the Certified Programs.

See CBFO Surveillance S-17-30 and CBFO Surveillance S-17-31.

WIPP M&O Contractor Payload Engineers will evaluate TRUCON codes to ensure compliance with the enhanced chemical compatibility evaluation.

The surveillance team reviewed DOE/WIPP 01-3194, CH-TRU Waste Content Codes (CH-TRUCON), Revision 52. In this revised document, a chemical compatibility evaluation was completed for the following CH-TRUCON code/waste stream combinations:

<table>
<thead>
<tr>
<th>CH-TRUCON Code</th>
<th>Waste Stream(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID 112/212</td>
<td>ID-RF-S3114</td>
</tr>
<tr>
<td>SR 125/225</td>
<td>SR-221H-PuOx</td>
</tr>
</tbody>
</table>

WIPP M&O Contractor will implement additional checks in the WDS for each container before those containers can be used to populate payloads in WDS.

The surveillance team evaluated the additional checks in the WDS. WDS release number 2.7.3 on January 24, 2017, implemented the DSA section 18.8 required checks as a permanent modification to the WDS. Specifically, Chemical Compatibility, Acceptable Knowledge (AK) Assessment, Integrated Waste Management Document Lists, and statistical Material at Risk evaluations have been implemented. Basis of Knowledge evaluation prior to shipment is controlled by procedure WP 08-NT3021,
Approval of Shipments in the Waste Data System. WDS Version 2.8.1, currently in testing, will address the remainder of the automated checks specific to the enhanced AK process. The NWP Central Characterization Program (CCP) Site Project Managers also perform a manual check for all of the enhanced AK elements, implementing work steps of CCP-TP-200, Chemical Compatibility Evaluation Memorandum and Acceptable Knowledge Assessment Review. Also see Surveillance S-17-07 for further documentation of the implementation of the WDS checks.

Requirement:

The WIPP M&O Contractor will obtain written approval from CBFO prior to release of waste streams for shipment.

The surveillance team reviewed the approval letters CBFO:ONTP:JS:RMS:17-0619:UFC 5900.00 and CBFO:ONTP:JS:RMS:17-0618:UFC 5900.00 for waste streams ID-RF-S3114 and SR-221H-PuOx. The approval letters contain the written approval from CBFO prior to release of the waste streams for shipment.

Requirement:

The WIPP M&O Contractor will verify each container requested is part of a CBFO-approved waste stream and authorizes shipment in WDS.

The surveillance team reviewed the approval letters CBFO:ONTP:JS:RMS:17-0619:UFC 5900.00 and CBFO:ONTP:JS:RMS:17-0618:UFC 5900.00 for waste streams ID-RF-S3114 and SR-221H-PuOx. The approval letters state the waste streams have been verified by the WIPP management and operating contractor and that CBFO approves the waste streams and authorizes their shipment in WDS. The surveillance team also reviewed the ID-RF-S3114 and SR-221H-PuOx waste streams in WDS and verified they are approved.

Corrective Actions:

Corrective Action Reports/Deficiencies Corrected During the Surveillance

No Corrective Action Reports/Deficiencies were produced as a result of the surveillance.

Observations

No Observations were produced as a result of the surveillance.

Recommendations

No Recommendations were produced as a result of this surveillance
Surveillance Team Conclusions:

The surveillance team concludes that all of the DSA section 18.8 requirements have been met and that the "Read Only" function of the WDS can be removed so that the resumption of shipments to WIPP using previously certified waste from waste streams ID-RF-S3114 and SR-221H-PuOx can occur.

Surveillance Team Leader: Jim Vernon, CTAC

Date: 3-31-17

CBFO OQA Director Approval: Date: 3-31-17
Ms. Mary McDaniel, Manager
Quality and Contractor Assurance
Nuclear Waste Partnership LLC
P.O. Box 2078
Carlsbad, NM 88221-2078

Subject: Issuance of Report for Surveillance S-17-34, Transportation Authorization Surveillance for the LANL/CCP TRU Waste Stored at WCS

Dear Ms. McDaniel:

The Carlsbad Field Office (CBFO) conducted Surveillance S-17-34, Transportation Authorization Surveillance for the Los Alamos National Laboratory (LANL) Central Characterization Program (CCP) Transuranic (TRU) Waste Stored at Waste Control Specialists (WCS), April 24 – 26, 2017. The surveillance report is enclosed. The surveillance was conducted to verify that all of the requirements of CCP-TP-201, Revision 0, Verification of Shipping Criteria and Emplacement Criteria, have been implemented, specifically for waste stream LA-MHD01.001.

The surveillance team concluded that the applicable requirements of DOE/CBFO-94-1012, Quality Assurance Program Document, DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, DOE/WIPP 07-3372, Waste Isolation Pilot Plant Documented Safety Analysis, CCP-TP-201, Verification of Shipping Criteria and Emplacement Criteria, and related quality assurance and technical implementing procedures specific to LA-MHD01.001 waste containers stored at WCS identified in this report have been met. At this time, all necessary requirements for the completion of CCP-TP-201 Attachment 1 have been met except for the requirement for receipt of CBFO written approval to ship the waste stream or sub-population. After the written approval from CBFO to ship the specific LA-MHD01.001 containers stored at WCS is received, CCP-TP-201 Attachment 1 – Site Project Manager Previously Certified Waste Shipping Criteria Review Checklist can be completed, releasing the specific LA-MHD01.001 waste to be shipped from WCS to the Waste Isolation Pilot Plant.

Based on the container certification dates reviewed, the containers meet the requirements of the Documented Safety Analysis (DSA) Chapter 18.8 for being previously certified waste prior to the DSA Revision 5b.

If you have any questions concerning the surveillance, please contact me at (575) 234-7476.

Sincerely,

Michael R. Brown, Director
CBFO, Office of Quality Assurance

Enclosure
cc: w/enclosure
J. Carawell, CBFO       *ED
W. Mackie, CBFO         ED
D. Miehs, CBFO          ED
M. Navarrete, CBFO       ED
M. Stapleton, CBFO       ED
M. Fineran, CBFO         ED
J.R. Stroble, CBFO       ED
K. Princen, CBFO         ED
C. Feamire, CBFO         ED
D. Standiford, CBFO      ED
P. Breidenbach, NWP      ED
F. Sharif, NWP           ED
M. Ramirez, NWP          ED
R. Reeves, NWP           ED
C. Simmons, NWP          ED
J. Harvill, NWP          ED
A.J. Fisher, NWP         ED
B. Pace, NWP             ED
C. Soateena, NWP         ED
D. Wade, NWP             ED
J. Carter, NWP           ED
V. Ballew, NWP           ED
S. Punchlos, NWP         ED
A. Boyea, NWP            ED
P. Martinez, CTAC        ED
C. Castillo, CTAC        ED
M. Leroch, CTAC          ED
J. Vernon, CTAC          ED
R. Blauvelt, CTAC        ED
R. Fitzgerald, CTAC     ED
R. Chavez, CTAC          ED
D. Harvill, CTAC         ED
G. White, CTAC           ED
CBFO QA File
CBFO M&RC
*ED denotes electronic distribution
CBFO SURVEILLANCE REPORT

Surveillance Number:  S-17-34  Date of Surveillance:  April 24 – 26, 2017

Surveillance Title:  Transportation Authorization Surveillance for the Los Alamos National Laboratory Central Characterization Program Transuranic Waste Stored at Waste Control Specialists (WCS)

Organization:  National TRU Program (NTP), Carlsbad Field Office (CBFO) Nuclear Waste Partnership (NWP) Central Characterization Program (CCP)

Surveillance Team:  

Michael Brown  Quality Assurance Director, CBFO Office of Quality Assurance
Jim Vernon  Surveillance Team Leader, CBFO Technical Assistance Contractor (CTAC) NQA-1, Lead Auditor
Dick Blauvelt  Team Member, Technical Specialist, CTAC – Acceptable Knowledge
Randy Fitzgerald  Team Member, Technical Specialist, CTAC – Acceptable Knowledge
Ricardo Chavez  Team Member, CTAC – Quality Assurance NQA-1 Auditor

Surveillance Scope:

In accordance with DOE/WIPP 07-3372, Revision 5b, Waste Isolation Pilot Plant Documented Safety Analysis (WIPP DSA), section 18.1, an independent assessment was conducted by CBFO Quality Assurance. This independent assessment is a smaller assessment of a specific activity; therefore, Surveillance S-17-34 was conducted.

The surveillance team evaluated Los Alamos National Laboratory Central Characterization Program (LANL/CCP) preparations to ship waste from LANL/CCP Waste Stream LA-MHD01.001 (Summary Category Group S5000) for compliance to the WIPP DSA, section 18.8, and DOE/WIPP-02-3122, Revision 8, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC), Appendix H (H.5) and I. This activity is performed to evaluate shipment readiness of specific waste containers stored at WCS in the Container Storage Building for compliance with upper-tier requirements.

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1 All of the team members and technical specialists were selected on the basis of meeting the technical qualifications and knowledge of the item and/or process being assessed.
DA

It is submitted to CCP Records and the SPM provides a copy to the WDS.

Review Checklist: After the Attachment I is completed, per the procedure the Attachment I - SPM Previously Certified Waste Shipping Crib샀 are completed. The WDS attach a shipping crib샀 and load to be shipped. The attached shipping crib샀 and load are determined that any

Chevronization Program (ARIN/CCP) CCP-TP-2.1, Verification of

During the Audit of the Oak Ridge National Laboratory Central

CCP-TP-2.1

Activity Evaluated:

Objective Evidence:

Attachment I - Cheek with Arin in Rades Below (by acquiring and reviewing relevant documents) and with the generator. The generator sheet, which is a complete list of the WISP DSA, section 16.8 requirements for transferring waste to be shipped from the WISP DSA (DA). The CCP-TP-2.1 process ensures the WISP DSA that all of the CCP records and copies thereof are provided to the waste data system (WDS) database by the CCP Record Manager (SRM) after completion is submitted to the CCP. The CCP verifies the correctness of the waste data system by inserting the waste data into the database and verifying that it is correct.

Implementation of CCP-TP-2.1, Verification of Shipping Crib샀 and

Surveillance Results:

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<th>Container #</th>
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<th>Type Code</th>
<th>Container ID</th>
<th>Category</th>
</tr>
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<td>2</td>
<td>LAM100000</td>
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<td>LAM100000</td>
</tr>
</tbody>
</table>

Followup:

The individual containers of WCS that are subject to surveillance S-17-34 are as

Page 2 of 7

S-17-34
During Surveillance S-17-34, a completed CCP-TP-201 Attachment 1 - SPM Previously Certified Waste Shipping Criteria Review Checklist for waste stream LA-MHD01.001 was not presented to the surveillance team; however, the surveillance team reviewed the necessary process to complete the Attachment 1.

1. Has a CCEM been submitted to CBFO in accordance with CCP-TP-200 for this waste stream or sub-population?

**Completed**

**Objective Evidence:**

The surveillance team reviewed the Chemical Compatibility Evaluation Memorandum (CCEM) for the waste stream LA-MHD01.001, source document CCE06. The CCEM was generated in accordance with CCP-TP-005, Revision 29, CCP Acceptable Knowledge Documentation. The surveillance team also reviewed the CCP-TP-200, Revision 1, Attachment 1 - SPM Chemical Compatibility Evaluation Review Checklist and Attachment 2 - SPM Acceptable Knowledge Assessment Review Checklist for LA-MHD01.001.

2. Has a BOK memorandum been submitted to CBFO in accordance with CCP-TP-005 for this waste stream or sub-population?

**Completed**

**Objective Evidence:**

The surveillance team reviewed the original and the amended Basis of Knowledge (BOK) memorandum for waste stream LA-MHD01.001. The BOK memorandum was generated in accordance with CCP-TP-005, Revision 29, CCP Acceptable Knowledge Documentation.

3. Has CBFO CCEM written concurrence for this waste stream or sub-population been received?

**Completed**

**Objective Evidence:**

The surveillance team received the amended CBFO approval of the CCE06 Chemical Compatibility Evaluation for Waste Stream LA-MHD01.001 to limit approval to a waste stream subpopulation at the Container Storage Building at WCS and rescinding waste stream, CBFO memorandum CBFO:ONTP:JS:RMS:17-0630:UFC 5900.00.
4. Has a CBFO BOK written concurrence for this waste stream or sub-population been received?

Completed

Objective Evidence:


5. Has a CBFO Waste Stream Profile Form (WSPF) written approval for this waste stream been received?

Completed

Objective Evidence:

Revision 1 for waste stream LA-MHD01.001, CP:13:01218, was reviewed by the surveillance team. Revision 1 was approved on May 22, 2013.

6. Has a CBFO TRUCON code approval for this waste stream been received?

Completed

Objective Evidence:

The surveillance team reviewed DOE/WIPP 01-3194, CH-TRU Waste Content Codes (CH-TRUCON), Revision 53. In this revised document, a chemical compatibility evaluation was completed for the following CH-TRUCON code/waste stream combinations:

<table>
<thead>
<tr>
<th>CH-TRUCON Code</th>
<th>Waste Stream(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA 111/211</td>
<td>LA-MIN03-NC.001</td>
</tr>
<tr>
<td>LA 125/225</td>
<td>LA-MHD01.001</td>
</tr>
<tr>
<td></td>
<td>LA-MHD08.001</td>
</tr>
</tbody>
</table>
7. Has the WDS Data Administrator (DA) implemented additional checks in the WDS before containers can be used to populate payloads in the WDS; as verified through written correspondence.

Completed

Objective Evidence:

Nuclear Waste Partnership (NWP) implemented additional checks in the WDS for each container before those containers can be used to populate payloads in WDS. See CBFO Surveillance S-17-32, NWP Readiness to Remove Read Only Controls from WDS, and Surveillance S-17-07, Waste Data System.

The surveillance team also reviewed the Acceptable Knowledge Assessment (AKA) for waste stream LA-MHD01.001 and Addendum 1 and confirmed that all the containers associated with this surveillance have been assigned to the AKA.

8. Has CBFO written approval to ship the waste stream or sub-population been received?

Completed

Objective Evidence:

At this time the CBFO written approval to ship the waste stream or sub-population for LA-MHD01.001 has not been received. The impact of not receiving the CBFO written approval to ship the waste stream or sub-population for LA-MHD01.001 is explained in the Surveillance Team Conclusions section of this report.
9. Have all containers been verified to be part of a CBFO-approved waste stream?

Completed

The surveillance team reviewed the approved Waste Stream Profile Form for waste stream LA-MHD01.001 and the proposed containers to be shipped from WCS to WIPP. All of the proposed containers to be shipped from WCS to WIPP are a part of a CBFO-approved waste stream. The surveillance team confirmed through container-specific characterization data that the eight containers associated with this surveillance are assigned to waste stream LA-MHD01.001 and were certified under an approved certification program (LANL/CCP).

10. Have all requirements of WIPP DSA Section 18.8 been satisfied?

Completed

The WIPP DSA section 18.8 criteria have been incorporated into CCP-TP-201, Attachment 1. This was evaluated during Audit A-17-21. When questions 1 – 9 of Attachment 1 are answered "yes" for the particular waste stream, all of the WIPP DSA section 18.8 criteria are considered met.

Corrective Actions:

Corrective Action Reports/Deficiencies Corrected During the Surveillance

No Corrective Action Reports/Deficiencies were produced as a result of this surveillance.

Observations

No Observations were produced as a result of this surveillance.

Recommendations

No Recommendations were offered as a result of this surveillance.

Surveillance Team Conclusions:

The surveillance team concluded that the applicable requirements of DOE/CBFO-94-1012, Quality Assurance Program Document, DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, DOE/WIPP 07-3372, Waste Isolation Pilot Plant Documented Safety Analysis,
CCP-TP-201, Verification of Shipping Criteria and Emplacement Criteria, and related quality assurance and technical implementing procedures specific to LA-MHD01.001 waste containers stored at WCS identified in this report have been met. At this time, all necessary requirements for the completion of CCP-TP-201 Attachment 1 have been met except for the requirement for receipt of CBFO written approval to ship the waste stream or sub-population. After the written approval from CBFO to ship the specific LA-MHD01.001 containers stored at WCS is received, CCP-TP-201 Attachment 1 – SPM Previously Certified Waste Shipping Criteria Review Checklist can be completed, releasing the specific LA-MHD01.001 waste to be shipped from WCS to the Waste Isolation Pilot Plant.

Surveillance Team Leader: 
Jim Vernon, CTAC 
Date: 4-26-17

CBFO OQA Director Approval: 
Michael R. Brown 
Date: 4/26/2017