Nuclear Waste Partnership LLC

Corrective Action Plan Addendum

Radiological Release Event (Phase II)

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NWP President & Project Manager Date

Nuclear Waste Partnership LLC

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Table of Contents

ACRONYMS

AIB	Accident Investigation Board
AK	Acceptable Knowledge
ANL	Argon National Laboratory
CBFO	U.S. Department of Energy Carlsbad Field Office
CCP	Central Characterization Program
CH	Contact Handled
DSA	Documented Safety Analysis
DOE	U.S. Department of Energy
FHA	Fire Hazard Analysis
INL	Idaho National Laboratory
JON	Judgment of Need
LANL	Los Alamos National Laboratory
ORNL	Oak Ridge National Laboratory
NTP	National TRU Program
NWP	Nuclear Waste Partnership LLC
PA	Performance Assessment
RCRA	Resource Conservation and Recovery Act
RH	Remote Handled
RTR	Real Time Radiography
SNL	Sandia National Laboratory
SRS	Savannah River Site
TRU	Transuranic
TWPC	Transuranic Waste Processing Center
U/G	Underground
VE	Visual Examination
WAC	Waste Acceptance Criteria
WCRRF	Waste Characterization, Reduction, and Repackaging Facility
WIPP	Waste Isolation Pilot Plant

1.0 INTRODUCTION

On Friday, February 14, 2014 there was an incident in the underground (U/G) repository at the Waste Isolation Pilot Plant (WIPP), which resulted in the release of americium and plutonium from one or more transuranic (TRU) waste containers into the U/G mine and the environment. The accident investigation was performed in two phases. This addendum is intended to address the Judgments of Need identified in the Accident Investigation Board's Phase II report.

2.0 ACCIDENT INVESTIGATION

On February 27, 2014, the Deputy Assistant Secretary for Safety, Security, and Quality Programs, U.S. Department of Energy, Office of Environmental Management, formally appointed a second Accident Investigation Board (the Board) to investigate the radiological release in accordance with DOE O 225.1B, *Accident Investigations*.

The Board began the investigation on March 3, 2014, completed Phase 1 of the investigation on March 28, 2014, and submitted the report to the Acting Deputy Assistant Secretary for Safety, Security, and Quality Programs, U.S. Department of Energy, Office of Environmental Management on April 1, 2014. The Phase 1 report covers the Board's conclusions for the release of TRU from the U/G to the environment. Based upon the conclusions of this accident investigation, the Board concluded that the above ground release identified in Phase 1 of the investigation was preventable. On April 24, 2014 the Board's Accident Investigation Report (Report) was published and made available to Nuclear Waste Partnership LLC (NWP).

On May 19, 2014, the Deputy Assistant Secretary, Safety, Security, and Quality Programs, U.S. Department of Energy, Office of Environmental Management, appointed an Accident Investigation Board to complete the investigation (Phase 2). Phase 2 was performed once limited access to the underground was re-established and focused on how the radiological material was released. The Board was appointed to perform an accident investigation and to prepare an investigation report in accordance with Department of Energy Order 225.1B, *Accident Investigations*.

The Board concluded that the following causes, related to NWP, contributed to the accident.

1. Failure of the Central Characterization Program (CCP) to develop an Acceptable Knowledge (AK) for the mixed inorganic nitrate waste stream (LA-MIN02-V.001) that adequately captured all available information regarding waste generation and subsequent repackaging activities in order to prevent the generation, shipment, and emplacement of corrosive, ignitable, or reactive waste. Specifically, the AK Summary Report did not capture changes made to the Waste Characterization, Reduction, and Repackaging Facility (WCRRF) glove-box procedure. The addition of a secondary waste material was not adequately considered.
2. Failure of Nuclear Waste Partnership LLC (NWP) to ensure that the WIPP Fire Hazard Analysis (FHA) recognized the potential for a fire starting within the waste array as well as the potential for propagation within the array. As a result, fire protection controls focused on prevention of propagation to the array from external sources (e.g., vehicles) and did not consider the magnitude of the combustible material hazard.

3.0 JON Action Plans

The following subsections include the 8 JONs pertaining to NWP. Each subsection includes the AIB Report Judgments of Need (JON) description and NWP's approach for addressing the JON. Actions, deliverables, action owners, and planned due dates are listed in table format.

Judgment of Need (JON 2)

JON 2: The National TRU Program (NTP) needs to reevaluate and strengthen the certification audit process across the DOE complex at all generator sites to include:

- Evaluation of waste generator repackaging operations that prepare TRU waste for characterization;
- Implementation of waste generator site processes as they relate to TRU waste management;
- Verification that changes to processes are correctly incorporated into acceptable knowledge summary reports;
- Verification of effective implementation documentation and programs to ensure that waste generator activities comply with the generator site Resource Conservation and Recovery Act (RCRA) permit; and
- Evaluation of local site office oversight of TRU waste operations.

Approach

As co-permittee, NWP will participate in benchmarking the National Nuclear Safety Site Low-Level Waste generator site certification and oversight program, and assist in evaluating the portions of the program that should be adopted as a TRU waste certification and oversight program. A comprehensive TRU waste certification and oversight program will then be revised or developed and implemented by the co-permittees, which verifies process changes are incorporated, are in compliance with local RCRA requirements, and that evaluate local oversight of TRU waste operations.

P2JON 2				
Number	**Action**	**Deliverable**	**Action Owner**	**Due Date**
1	Benchmark the National Nuclear Safety Site Low-Level Waste generator site certification and oversight program.	Evaluation report and recommendations.	NWP Deputy Manager	9/30/2015
2	On behalf of NTP, co-permittees develop a comprehensive review process based on the benchmark evaluation report, with participation from the generator sites that includes the following elements: • Evaluation of waste generator repackaging operations that prepare TRU waste for characterization;	An approved and issued review process.	NWP Deputy Manager	11/30/2015

	• Implementation of waste generator site processes as they relate to TRU waste management; • Verification that changes to processes are correctly incorporated into AK Summary Reports; • Verification of effective implementation documentation and programs to ensure that waste generator activities comply with the generator site Resource Conservation and Recovery Act (RCRA) permit; and • Evaluation of local site office oversight of TRU waste operations. • Evaluation of waste generator site deferred maintenance in TRU waste program operations			
3	Evaluate and identify organization and personnel requirements to support implementation of a TRU waste certification program.	Evaluation Report	NWP Deputy Manager	11/30/2015
4	Train designated personnel to revised process.	Training determination, training material and documentation of completion (e.g., rosters, required reading etc.). Training records providing objective evidence that at least 80% of the designated staff have successfully completed training to the revised process. Untrained personnel will not be authorized to perform the associated functions.	NWP Deputy Manager	12/31/2015

Judgment of Need (JON 7)

The Central Characterization Program (CCP) needs to improve implementation of requirements in CCP-PO-001 such that characterization methods are able to ensure that all Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria (WAC) requirements are met.

Approach

CCP will revise CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan* to strengthen and clarify the requirements for implementation of characterization methods Acceptable Knowledge (AK), Real Time Radiography (RTR), and Visual Exam (VE)) to ensure compliance with the WAC. The requirements of CCP-PO-001 allow characterization methods to ensure compliance with the WAC by VE, RTR and review of the AK documentation. Implementation of action plans in JONs 8 and 12 will strengthen the CCP and lead to identification of wastes that would require the D001, D002 or D003 codes that could not otherwise be identified by VE or RTR. To ensure WAC requirements are met, CCP will strengthen the requirements relating to AK in CCP-TP-005 to include preparation of a chemical compatibility memorandum, formalization of AK briefings, and performance of an AK assessment. This assessment will ensure an integrated verification of the effectiveness of AK documentation relating to the management of potentially energetic TRU waste forms (reactive, ignitable and incompatible materials) is adequate, current, and accurately described in the AK Summary Reports. Interface Documents will be revised to include the roles and responsibilities to ensure the integrated verification of AK documentation. Waste certified prior to approval of the revised host site Interface Document will be subject to screening process per CBFO CAP JON 11.9.

P2JON 7				
Number	**Action**	**Deliverable**	**Owner**	**Due Date**
1	Revise CCP-TP-005, *Acceptable Knowledge Documentation.*	Submit to Carlsbad Field Office (CBFO) for review and approval.	CCP Certification Manager	7/15/2015
2	Develop a programmatic procedure for development of CCP/ host site Interface Documents.	Submit to Carlsbad Field Office (CBFO) for review.	CCP Operations Manager	8/31/2015
3	Revise Interface Documents for all host sites with active characterization activities.	Approved host site Interface Documents.	CCP Operations Manager	2/29/2016
4	Revise CCP-PO-001 AK requirements.	Submit Revised CCP-PO-001 to CBFO for review and approval.	CCP Certification	9/30/2015

			Manager	
5	Train to Procedures: CCP-TP-005, *Acceptable Knowledge Documentation* CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan* CCP-PO-043, *CCP Interface Document Preparation* CCP-PO-004, *CCP/SRS Interface Document* CCP-PO-012, *CCP/LANL Interface Document* CCP-PO-024, *CCP/INL Interface Document* CCP-PO-027, *CCP/TWPC/ORNL Interface Document* CCP-PO-500, *CCP/ANL RH-TRU Waste Interface Document* CCP-PO-501, *CCP/INL RH-TRU Waste Interface Document* CCP-PO-510, *CCP/SNL Interface Document*	Training determination, training material and documentation of completion (e.g., rosters, required reading etc.). Training records providing objective evidence that at least 80% of the designated staff have successfully completed training to the revised process. Untrained personnel will not be authorized to perform the associated functions.	CCP Support Services Manager	3/29/2016

Judgment of Need (JON 8)

The CCP needs to improve the level of rigor in reviewing and approving AK Summary Reports for compliance with requirements.

Approach

CCP will revise and strengthen the requirements of CCP-TP-005, Acceptable Knowledge Documentation and the host site Interface Documents to include more stringent controls on the preparation, review and approval of AK Summary Reports. Host site Interface Documents will require a more comprehensive list of documents to be developed and maintained by CCP's System of Controls. This will include a more formalized approach to coordination and independent review of documents and operations procedures to include strengthening the control of secondary waste generation. The AK Summary Reports will be reviewed and approved by a broader cross section of disciplines in addition to the current required reviewers. This complement of more detailed requirements will serve to improve communications between the host site and CCP. The revision of CCP-TP-005 and the host site Interface Documents will require implementation of an integrated verification of the effectiveness of AK documentation and management assessments for verification of AK inputs by CCP. Waste certified prior to approval of the revised host site Interface Document will be subject to screening process per CBFO CAP JON 11.9.

P2JON 8				
Number	**Action**	**Deliverable**	**Owner**	**Due Date**
1	Revise CCP-TP-005, *Acceptable Knowledge Documentation.*	Submit to CBFO for review and approval.	CCP Certification Manager	7/15/2015
2	Revise Interface Documents for all host sites with active characterization activities.	Approved host site Interface Documents.	CCP Operations Manager	02/29/2016
3	Train to Procedures: CCP-TP-005, *Acceptable Knowledge Documentation* CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan* CCP-PO-043, *CCP Interface Document Preparation* CCP-PO-004, *CCP/SRS Interface Document* CCP-PO-012, *CCP/LANL Interface Document* CCP-PO-024, *CCP/INL Interface Document* CCP-PO-027, *CCP/TWPC/ORNL Interface Document* CCP-PO-500, *CCP/ANL RH-TRU Waste*	Training determination, training material and documentation of completion (e.g., rosters, required reading etc.). Training records providing objective evidence that at least 80% of the designated staff have successfully completed training to the revised process. Untrained personnel will not be authorized to perform the associated functions.	CCP Support Services Manager	3/29/2016

	Interface Document CCP-PO-501, *CCP/INL RH-TRU Waste Interface Document* CCP-PO-510, *CCP/SNL Interface Document*			

Judgment of Need (JON 12)

The CCP needs to reevaluate and strengthen the process used to conduct review and approval of source documents that have an impact on Acceptable Knowledge.

Approach

CCP will revise and strengthen the requirements of CCP-TP-005, Acceptable Knowledge Documentation and the host site Interface Documents to more clearly delineate the roles and responsibilities of the host site and CCP. This will place more stringent controls on the review of AK source documents (e.g., new or revised procedures and processes, work control documentation, Material Safety Data Sheets (MSDS), and technical basis documentation) that could impact the characterization of waste. Site Interface Documents will require a more comprehensive list of documents to be developed and maintained by CCP's System of Controls. This will include a more formalized approach to coordination and independent review of documents and operations procedures to include strengthening the control of secondary waste generation. The AK Summary Reports will be reviewed and approved by a broader cross section of disciplines in addition to the current required reviewers. The revision of CCP-TP-005 and the host site Interface Documents will require implementation of management assessments for verification of AK inputs by CCP. Waste certified prior to approval of the revised host site Interface Document will be subject to screening process per CBFO CAP JON 11.9.

P2JON 12				
Number	**Action**	**Deliverable**	**Owner**	**Due Date**
1	Revise CCP-TP-005 *Acceptable Knowledge Documentation.*	Submit to CBFO for review and approval.	CCP Certification Manager	7/15/2015
2	Revise Interface Documents for all host sites with active characterization activities.	Approved host site Interface Documents.	CCP Operations Manager	02/29/2016
3	Train to Procedures: CCP-TP-005, *Acceptable Knowledge Documentation* CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan* CCP-PO-043, *CCP Interface Document Preparation* CCP-PO-004, *CCP/SRS Interface Document* CCP-PO-012, *CCP/LANL Interface Document* CCP-PO-024, *CCP/INL Interface Document* CCP-PO-027, *CCP/TWPC/ORNL Interface Document* CCP-PO-500, *CCP/ANL RH-TRU Waste*	Training determination, training material and documentation of completion (e.g., rosters, required reading etc.). Training records providing objective evidence that at least 80% of the designated staff have successfully completed training to the revised process. Untrained personnel will not be authorized to perform the associated functions.	CCP Support Services Manager	3/29/2016

	Interface Document CCP-PO-501, *CCP/INL RH-TRU Waste Interface Document* CCP-PO-510, *CCP/SNL Interface Document*			

Judgment of Need (JON 33)

Nuclear Waste Partnership (NWP) needs to re-evaluate the quantities, type, and form of exposed combustible emplacement materials used in the waste array and take action to minimize the fire ignition and propagation risks (e.g., eliminate unnecessary materials, and include fire retardant additives).

Approach

NWP will identify exposed combustible materials used in the emplacement of RH and CH waste, and determine actions necessary to eliminate unnecessary materials and/or for treatment with fire retardant additives. The evaluation will consider performance assessment and hazardous waste permit impacts, which may lead to longer term actions and further benefit analysis. Implementation is likely to impact waste handling procedures and material procurement specifications as well as have the potential to impact waste generator processes. The evaluation results will be incorporated into the FHA as appropriate.

P2JON 33				
Number	**Action**	**Deliverable**	**Owner**	**Due Date**
1	Identify the exposed combustible materials used in the emplacement of RH and CH waste.	Completed evaluation identifying the materials, including quantities, type and form.	Engineering Manager	7/22/2015
2	Evaluate the identified materials and determine actions necessary to eliminate unnecessary materials and/or treatment with fire retardant additives. Consider potential PA impacts. Recommendations that might impact the PA will be included in a plan for long term actions.	Completed evaluation, including recommendations.	Engineering Manager	8/31/2015
3	Develop implementation plan including the identified actions to minimize the fire ignition and propagation risks in the waste array.	Implementation plan submitted to CBFO.	Engineering and Operations Managers	10/16/2015

Judgment of Need (JON 34)

NWP needs to revise the waste array emplacement strategy to include criteria that limit the risk of fire propagation within the array and to include limiting the quantity of radiological waste that is at-risk from a single fire or explosion event.

Approach

NWP will evaluate the waste array emplacement strategy to identify measures to limit the risk of fire propagation and to limit the quantity of radiological waste that is at-risk from a single fire or explosion event. The evaluation will consider performance assessment and hazardous waste permit impacts, which may lead to longer term actions and further benefit analysis. Implementation is likely to impact waste handling procedures and material procurement specifications as well as have the potential to impact waste generator processes. The evaluation will consider emplacement strategy for future waste receipts, and will not consider currently emplaced waste in closed panels/rooms.

P2JON 34				
Number	**Action**	**Deliverable**	**Owner**	**Due Date**
1	Evaluate the waste array emplacement strategy with consideration of the at risk radiological waste to limit the risk of fire propagation and to limit the quantity of radiological waste that is at-risk from a single fire or explosion event. Consider potential PA impacts. Recommendations that might impact the PA will be included in a plan for long term actions.	Completed evaluation, including recommendations.	Engineering, Fire Protection Engineering, and Operations Managers	8/31/2015
2	Develop implementation plan including the identified actions to minimize the fire ignition and propagation risks in the waste array and to limit the quantity of radiological waste that is at-risk from a single fire or explosion event.	Implementation plan submitted to CBFO.	Engineering, Fire Protection Engineering, and Operations Managers	10/16/2015

Judgment of Need (JON 35)

NWP needs to revise the FHA to identify and address all credible fire and explosion scenarios initiated within the waste array underground.

Approach

NWP will revise the FHA to ensure that credible fire and explosion scenarios, initiated within the RH and CH waste arrays and transport paths in the underground, are identified and addressed in the FHA. Revisions to the FHA are coordinated with the CBFO as part of the Fire Protection Program and DSA revisions.

P2JON 35				
Number	**Action**	**Deliverable**	**Owner**	**Due Date**
1	NWP will identify credible fire and explosion scenarios initiated within the underground RH and CH waste arrays, including transport paths.	An issued FHA.	Fire Protection Engineering Manager	8/31/2015
2	NWP will evaluate credible fire and explosion scenarios initiated within the underground RH and CH waste arrays, including transport paths.	An issued FHA.	Fire Protection Engineering Manager	8/31/2015

Judgment of Need (JON 36)

NWP needs to reevaluate and revise WIPP FHA to better characterize the fire risks associated with transuranic (TRU) waste packaging during handling and storage. This needs to include reevaluation of actions detailed in the WIPP Recovery Plan.

Approach

NWP will revise the FHA to reflect fire risks associated with waste packaging during handling and storage based on actual experience from the radiological event and will include the ventilation and combustible control limits in place during recovery activities.

P2JON 36				
Number	**Action**	**Deliverable**	**Owner**	**Due Date**
1	NWP will revise the FHA to reflect fire risks associated with waste packaging during handling and storage based on actual experience from the radiological event.	Issued FHA.	Fire Protection Engineering Manager	8/31/2015
2	NWP will revise the FHA to reflect the ventilation and combustible control limits in place during recovery activities and waste handling and storage activities.	Issued FHA.	Fire Protection Engineering Manager	8/31/2015