

U.S. Department of Energy


Corrective Action Plan for
Environmental Management Headquarters
*Phase 2: Radiological Release Event at the
Waste Isolation Pilot Plant on
February 14, 2014*



Washington, DC 20585

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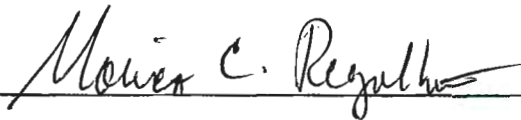
**Corrective Action Plan for
Environmental Management Headquarters
*Phase 2: Radiological Release Event at the
Waste Isolation Pilot Plant on
February 14, 2014***



Date:

10/6/15

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Date:

10/15/15

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ACRONYMS

AIB	Accident Investigation Board
CAM	Continuous Air Monitor
CAP	Corrective Action Plan
CBFO	Carlsbad Field Office
CFR	Code of Federal Regulations
CMR	Central Monitoring Room
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EM	Office of Environmental Management
EMCBC	Environmental Management Consolidated Business Center
EOC	Emergency Operations Center
FSM	Facility Shift Manager
HEPA	High-Efficiency Particulate Air
HQ	Headquarters
ISM	Integrated Safety Management
JON	Judgment of Need
LANS	Los Alamos National Security, LLC
NA-LA	NNSA Los Alamos Field Office
NNSA	National Nuclear Security Administration
NTP	National Transuranic Program
NWP	Nuclear Waste Partnership, LLC
ORPS	Occurrence Reporting and Processing System
PISA	Potentially Inadequate Safety Analysis
SCWE	Safety Conscious Work Environment
TRU	Transuranic
TSR	Technical Safety Requirements
USQ	Unreviewed Safety Question
WIPP	Waste Isolation Pilot Plant

1.0 PURPOSE

The purpose of this Corrective Action Plan (CAP) is to specify U.S. Department of Energy (DOE) actions for addressing Office of Environmental Management (EM) Headquarters (HQ) issues identified in the *Accident Investigation Report for the Phase 2: Radiological Release Event at the Waste Isolation Pilot Plant (WIPP) on February 14, 2014*. The report identified 24 Conclusions and 40 Judgments of Need (JONs). Six of the Conclusions and five of the JONs were determined to be associated with EM HQ oversight of the operations. As such, EM HQ has taken the action to develop the CAP for those JONs specific to HQ (i.e., JONs 6,30,31,37 and 40). This report documents those corrective actions, along with the responsible office and due dates for completing the actions. The *Phase 2: Radiological Release Event at the Waste Isolation Pilot Plant (WIPP) on February 14, 2014* report identified issues with both EM and National Nuclear Security Administration (NNSA) organizations. The organizations associated with EM activities included EM HQ, Carlsbad Field Office (CBFO), National Transuranic Program (NTP), and Nuclear Waste Partnership, LLC (NWP). The organizations associated with NNSA activities included NNSA HQ, NNSA Los Alamos Field Office (NA-LA) and Los Alamos National Security, LLC (LANS). EM and NNSA jointly established two review teams that evaluated the program issues identified in this report. One review team (Technical Team) concentrated on the technical issues regarding treatment of the waste while a second review team (Management Team) reviewed the issues regarding the organizational problems. The overall approval process for the EM CAPs associated with this event assigns approval responsibility to the next higher authority. Specifically, CBFO will approve the NWP CAP (with EM HQ concurrence); EM HQ Office of Safety, Security, and Quality Programs (EM-40) will approve the CBFO CAP (including the NTP); and EM-1 will approve the EM HQ CAP.

2.0 BACKGROUND

On Friday, February 14, 2014, there was an incident in the underground repository at the DOE Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, which resulted in the release of americium and plutonium from one or more transuranic (TRU) waste containers into the environment. The WIPP is a deep geologic repository, mined out of a thick bed of salt, for the disposal of defense TRU waste generated primarily from the cleanup of DOE sites. The release was detected by an underground continuous air monitor (CAM) and as a result, exhaust ventilation was directed through high-efficiency particulate air (HEPA) filter banks located in the surface exhaust building. However, a measurable portion of the exhaust bypassed the HEPA filters via design leakage through two ventilation system dampers and was discharged directly into the environment from an exhaust duct. No personnel were determined to have received external contamination; however, 21 individuals were identified through bioassay to have initially tested positive for low level amounts of internal contamination as of March 28, 2014. Trace amounts of americium and plutonium were detected off-site.

The review of the causes and response to this event was conducted in two parts. Part one – Phase 1- dealt with the subsequent response. A separate report on Phase 1 has been released and separate corrective action plans for Phase 1 have been developed and approved. Part two (the focus of this CAP) – Phase 2 – covers the direct, contributing and root causes that resulted in a drum in the underground of the WIPP disposal facility to spontaneously react in an uncontrollable manner that resulted in the release of the material. The Accident Investigation

Board (AIB) for Phase 2 began their investigation on May, 19 2014, and completed the Phase 2 investigation on April 16, 2015. This CAP has been prepared in response to the AIB's Phase 2 report Conclusions and JONs.

The specific Conclusions and JONs that were associated with DOE HQ and a summary of the Accident Investigation Report discussions are included in the section below.

Conclusions #4:

Carlsbad Field Office (CBFO) oversight activities associated with the characterization and certification of transuranic (TRU) waste were ineffective in identifying programmatic weaknesses through the execution of certification audits and surveillances at LANL.

JON #6: DOE Headquarters needs to review expectations documented in existing National TRU Program policy directives and take action necessary to clearly assert that CBFO, as the manager of the WIPP repository, has the authority to conduct oversight of waste generator site programs and processes necessary to provide assurance that any activities that could impact characterization and certification of waste are verified to be compliant.

CBFO, through oversight of the National TRU Program certification audits, assumed that local oversight was being effectively conducted as prescribed in the responsibilities identified in the WAC. CBFO did not effectively ensure (1) that LANS prepared implementation documentation and programs that met the requirements and criteria in the WAC, and (2) that TRU waste accepted for management and disposal at WIPP complied with the WIPP HWFP, applicable laws, and regulations as described in the WAC. CBFO personnel associated with the National TRU Program indicated in interviews that they did not have the authority to conduct oversight of the waste generator site activities beyond the Central Characterization Program (CCP) conducted characterization and certification processes, although the DOE Accident Investigation Board could find no evidence that such authority was limited. Key elements of the treatment and repackaging activities were not effectively evaluated during certification audits. Without effective oversight being conducted by the local field office, the gap in the oversight being performed by CBFO allowed fundamental flaws in the repackaging and treatment processes to continue unchecked. The Board also identified that since the advent of the CCP organization that, although meeting the stated requirements in the permit, the certification audit scope had degraded in focus and did not take a critical look at waste generator activities that were important to the characterization process.

Conclusions #18:

The Federal roles, responsibilities and execution for oversight of the activities between the generator site transuranic (TRU) waste program (LANL) and the TRU Waste Central Characterization Program (CCP) were inadequate.

JON #30: DOE Headquarters and CBFO need to conduct an extent of condition review of the overall Federal oversight across the DOE complex in all three key segments of the National TRU Program: the Generator Site TRU Waste Program, TRU Waste Certification Program, and the Disposal System Program (WIPP).

The Board noted that there is a gap in Federal oversight performance between CBFO National TRU Program and NA-LA of waste site activities. The Board observed that NA-LA oversight focused more on budget and schedule performance versus operational oversight. The Board also noted a lack of clearly defined Federal interface roles and responsibilities, and expectations between the LANL/generator site TRU waste program and the TRU waste certification program (CCP). Additionally, the Board identified inadequate CCP review and approval of waste management operating procedures/process changes, e.g., WCRRF glovebox operating procedure and inadequate Federal oversight of those processes.

Conclusion #19

DOE Headquarters did not perform DOE O 435.1, *Radioactive Waste Management*, oversight activities for implementation of requirements associated with the operational performance within the National Transuranic (TRU) Program.

JON #31: DOE Headquarters needs to develop and implement a DOE O 435.1 comprehensive oversight program for National TRU Program

The Board found no objective evidence of DOE Headquarters oversight activities for implementation of DOE O 435.1 requirements associated with the operational performance within the National TRU Program.

Conclusions #21:

The WIPP Fire Hazard Analysis (FHA) was ineffective in identifying and analyzing the potential for a fire starting within the waste array, as well as the potential for fire propagation within the array.

JON #37: The Office of Environmental Management Headquarters needs to ensure that waste generator site's FHAs adequately characterize the fire risks associated with TRU waste packaging during handling and storage.

The use of exposed combustible emplacement materials (e.g., fiberboard and polyethylene slip sheets, polyethylene reinforcement plates, polyethylene stretch wrap, cardboard stiffeners and polypropylene super sack fabric) in the array was not fully evaluated, nor was the quantity used fully understood. An evaluation of the combustible emplacement material mass based on fabrication documentation concluded that the actual mass of combustible materials in the array was 40 percent higher than was represented in the Waste Data System. NWP missed an opportunity to recognize and correct this error in 2011 when the Defense Nuclear Facilities Safety Board issued a letter dated June 24, 2011, to the Assistant Secretary for Environmental Management (sir_2011624_12300_18) with the attached Staff Issue Report, dated May 2, 2011, that identified the hazard associated with the MgO super sacks and other interstitial materials.

Conclusions #24/25:

Los Alamos National Security, LLC (LANS), Energy Solutions, LLC (ES) and NNSA Los Alamos Field Office (NA-LA) allowed the safety culture at the Los Alamos National Laboratory (LANL) to deteriorate within pockets of the organization as evidenced by the workers' feedback that they did not feel comfortable identifying issues that may adversely affect management direction, delay mission-related objectives, or otherwise affect cost or schedule. In addition, management failed to effectively respond to workers' issues regarding unexpected conditions, i.e., generation of smoke and foaming, encountered during waste processing activities.

Questioning attitudes were not welcomed by management and many issues and hazards did not appear to be readily recognized by site personnel

JON #40: DOE Headquarters needs to engage safety culture expertise to provide training and mentoring to LANS, ES, and NA-LA management on the principles of a strong safety culture and take appropriate corrective action based on the outcome.

The Board analyzed the various survey results coupled with several of the interviews and hotline feedback and perceived that LANL, NA-LA, and ES management did not welcome critical feedback, lacked credibility with the workforce, did not fully understand the complexities and hazards related to waste processing, did not effectively flow down expectations, and have fostered a culture where employees do not feel comfortable raising safety issues to management. As a contributing factor, WCCRF management did not effectively respond to worker questions when presented with unexpected issues during the process (e.g. foaming of waste, orange/yellow smoke in the glovebox, or adding items to the waste stream such as glovebox gloves). Interview results also identified that several of the managers and workers involved in the processing of the waste did not fully understand the complexities or hazards associated with the waste they were handling. It was not evident to the Board that these types of issues were openly discussed during senior management or work planning meetings. Significant changes to the processes for MIN02 repackaging (changes in the use of absorbents and neutralizing agents) were not adequately discussed or considered at these forums. This represents a lost opportunity to use the resources at LANL to address issues before they became problems. The Board perceived a reluctance of the Federal staff to identify areas of excessive workload to management and the adverse impact on their ability to provide adequate oversight. This is especially evident in the areas of waste management and RCRA compliance.

3.0 UNDERLYING CAUSES

The Board concluded that the direct cause of the accident was an exothermic reaction of incompatible materials placed into a LANL waste drum that resulted in a runaway exothermic reaction that lead to drum over-pressurization and release of a portion of the drum's contents. The root cause of the event was determined a failure of LANS to understand and effectively implement the LANL Hazardous Waste Facility Permit and that NA-LA and the NTP had failed to ensure that LANL adequately developed and implemented the required treatment procedures and incorporated the required rigor into those processes. The Board also identified twelve contributing causes.

As part of the AIB report, the team identified direct, root, and contributing causes for the radiological release event. The results from the investigation report are summarized here and discussed in more detail in the report.

Direct Cause – the immediate events or conditions that caused the accident.

The Board identified the direct cause of this accident to be an exothermic reaction of incompatible materials in LANL waste drum 68660 that led to thermal runaway, which resulted in over-pressurization of the drum, breach of the drum, and release of a portion of the drum's contents (combustible gases, waste, and wheat-based absorbent) into the WIPP underground. The Board reached this conclusion based on post-event forensic and fire analyses that determined that:

- Isotopic ratios in air sample media analyzed post-event are consistent with drum 68660 which is unique from other drums in the area of the release.
- The contents of waste drum 68660 included incompatible materials which created the potential for an exothermic reaction.
- Waste drum 68660 was the only waste container with an identified breach.
- The visual evidence associated with the identified breach was consistent with an exothermic reaction within drum 68660. This reaction resulted in internal heating of the drum that led to internal pressure buildup of combustible gases within the drum which exceeded the drum venting capacity. The drum lid extruded beyond the lid retention ring, deflected the lid, and resulted in rapid release of the materials from the drum. The combustible gases and solids ignited which then spread to other combustible materials within the waste array, i.e., fiberboard and polyethylene slip sheets, reinforcement plates, stretch wrap, cardboard stiffeners and polypropylene super sack fabric.

Root Cause – causal factors that, if corrected, would prevent recurrence of the same or similar accidents.

Root causes can be local (specific to the one accident), and/or systemic (common to a broad class of similar accidents). For this accident, the Board identified both local and systemic root causes.

Local Root Cause: A specific deficiency that, if corrected, would prevent recurrence of the same accident.

The Board identified the local root cause of the radioactive material release in the WIPP underground to be the failure of LANS to understand and effectively implement the LANL Hazardous Waste Facility Permit and Carlsbad Field Office directed controls. Specifically, LANL's use of organic, wheat-based absorbent instead of the directed inorganic absorbent such as kitty litter/zeolite clay absorbent in the glovebox operations procedure for nitrate salts resulted in the generation, shipment, and emplacement of a noncompliant, ignitable waste form.

Systemic Root Cause: A deficiency in a management system that, if corrected, would prevent the occurrence of a class of accidents, e.g., operational accidents caused by procedural deficiencies. The Board identified the systemic root cause as the Los Alamos Field Office (NA-LA) and National Transuranic Program/Carlsbad Field Office (CBFO) failure to ensure that

LANL had adequately developed and implemented repackaging and treatment procedures that incorporated suitable hazard controls and included a rigorous review and approval process. NA-LA and CBFO did not ensure the adequate flow down of the Resource Conservation and Recovery Act and other upper tier requirements, including the WIPP Hazardous Waste Facility Permit, Attachment C, Waste Analysis Plan, WIPP Waste Acceptance Criteria, and the LANL Hazardous Waste Facility Permit requirements into operating procedures at LANL.

Contributing Causes – events or conditions that collectively with other causes increased the likelihood or severity of an accident but that individually did not cause the accident. For the purposes of this investigation, contributing causes include those related to the cause of the radiological release to the environment, as well as those related to the subsequent response.

The Board identified twelve contributing causes to the radiological release investigated in Phase 2:

1. Failure of Los Alamos National Security, LLC (LANS) to implement effective processes for procedure development, review, and change control. Execution of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF) glovebox procedure resulted in a combination of incompatible materials and the generation of an ignitable, noncompliant waste.
2. Failure of Los Alamos National Security, LLC (LANS) to develop and implement adequate processes for hazard identification and control. As a result, an incompatible absorbent was specified and used during nitrate salt bearing waste processing.
3. Failure of the Los Alamos National Security, LLC (LANS) Contractor Assurance System (CAS) to identify weaknesses in the processes for operating procedure development; hazard analysis and control; and review that resulted in an inadequate glovebox operation procedure for processing the nitrate salt bearing waste.
4. 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) glovebox procedure. The addition of a secondary waste material was not adequately considered.
5. Failure of Los Alamos Field Office (NA-LA) and the National Transuranic (TRU) Program/Carlsbad Field Office (CBFO) to ensure that the CCP and LANS complied with Resource Conservation and Recovery Act (RCRA) requirements in the WIPP Hazardous Waste Facility Permit (HWFP) and the LANL HWFP, as well as the WIPP Waste Acceptance Criteria (WAC). Examples include the unapproved treatment (neutralization and absorption of liquids) and the addition of incompatible materials. As a result, waste containing incompatible materials was generated and sent to WIPP.
6. Failure of Los Alamos National Security, LLC (LANS), EnergySolutions, LLC (ES), and the NNSA Los Alamos Field Office (NA-LA) to ensure that a strong safety culture existed Los Alamos National Laboratory (LANL). As a result, although there was a questioning attitude, there was a failure to adequately resolve employee concerns which could have identified the generation of noncompliant waste prior to shipment.
7. Failure of the execution of the LANL Unreviewed Safety Question (USQ) process to identify the lack of a hazard analysis of the proposed changes to the Waste Characterization, Reduction,

and Repackaging Facility (WCRRF) glovebox waste repackaging procedure (i.e., consistent with Integrated Safety Management (ISM) core functions]), and to recognize that an incompatible reactive nitrate salt bearing waste would be created by using "organic" absorbents. As a result, the Unreviewed Safety Question Determination (USQD) did not ensure that nuclear safety basis documents, including the WCRRF and Area G Basis for Interim Operation (BIO), were updated to evaluate hazards associated with material incompatibility in the nitrate salt-bearing waste stream and to specify preventive or mitigative controls.

8. Failure of NNSA Los Alamos Field Office (NA-LA) to establish and implement adequate line management oversight programs and processes in accordance with DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*. As a result, weaknesses in Los Alamos National Security, LLC (LANS)/ Energy Solutions, LLC (ES) programs and waste operations procedures were not identified and corrected which allowed an ignitable, noncompliant nitrate salt-bearing waste to be generated, shipped, and emplaced at WIPP.

9. Failure of DOE Headquarters to perform adequate or effective line management oversight required by DOE Order 435.1, *Radioactive Waste Management*, dated July 9, 1999. As a result, waste containing incompatible materials was generated and sent to WIPP.

10. 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.

11. Failure of Los Alamos National Security, LLC (LANS)/Energy Solutions, LLC (ES) to adequately train and qualify ES operators and supervisors in the identification and control of incompatible materials during waste processing. As a result, personnel did not question the instruction to add organic absorbent and other secondary waste items to the nitrate salt bearing waste.

12. Failure of Energy Solutions, LLC (ES) operators and Los Alamos National Security, LLC (LANS)/ES supervisors to effectively execute the stop work process when unexpected conditions, including foaming reactions and smoke during waste processing, were encountered at Waste Characterization, Reduction, and Repackaging Facility (WCRRF). This resulted in waste containing incompatible materials being generated and sent to WIPP.

4.0 ISSUE RESOLUTION/CORRECTIVE ACTIONS

EM HQ will provide Federal staff to direct, track and validate the specific corrective actions in this plan. The "Lead" designated in the following actions is intended to indicate the individual responsible for coordinating that action. Other EM offices will be involved in the corrective action closure. The EM-40 office will collect a status of the actions identified in this plan and will provide a verbal or written status report to EM-1/2 as requested, at a minimum of once per quarter.

4.1 JON #6: DOE Headquarters needs to review expectations documented in existing National TRU Program policy directives and take action necessary to clearly assert that CBFO, as the manager of the WIPP repository, has the authority to conduct oversight of waste generator site programs and processes necessary to provide assurance that any activities that could impact characterization and certification of waste are verified to be compliant.

Issue Description

The authority of the National Transuranic Program and the expectation that it was responsible for the preparation of TRU waste for disposal at WIPP, including operations at generator sites, was not clearly established. The NTP did not have a comprehensive program to evaluate the preparation for all waste streams for disposal at WIPP. Waste streams that were evaluated were not subjected to a rigorous program to ensure the correct process to treat the waste was carried out at the generator sites. In addition, EM/HQ expectation of roles and responsibilities for the National Transuranic Program were not clearly communicated DOE-wide. The NTP, in some cases, applied more resources to the scheduling aspects of managing the TRU waste program than the oversight aspects of the program.

Approach

The EM Deputy Assistant Secretary for Waste Management will develop and recommend to the Assistant Secretary for the Office of Environmental Management a policy on roles, responsibilities, authorities, and accountability for the management of the National TRU Program (including National TRU Program authority at TRU waste generator sites). EM HQ will issue directives to the generator sites asserting the NTP authority to review, approve and oversee generator site processing of TRU waste for disposal at WIPP.

Deliverable/Milestone/Due Dates

Objective 1: DOE HQ will take action to establish an NTP organization that has the assets to oversee the Transuranic waste program throughout the DOE and has the authority to oversee preparation of TRU waste at any generator site in the DOE that is ultimately planned for disposal at WIPP.

Action JON 6.1: EM-30 will evaluate the options for a NTP reporting relationship and recommend an option to EM-1 for approval.

Deliverables: Approved EM-1 letter that directs the NTP organizational alignment.

Due December 31, 2015

Lead: Doug Tonkay, EM-31

Action JON 6.2: EM-30 will generate a letter for EM-1 approval directing that the NTP has the full authority to manage all aspects of TRU waste destined for disposal at WIPP.

Deliverables: Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).

Due Date: December 31, 2015

Lead: Doug Tonkay, EM-31

Action JON 6.3: EM-30 will generate a letter to the NTP directing that safe operation of the National TRU Program shall take precedence over schedule and program priorities and that during this transition back to operations, that any issues or conflicts that challenge this directive will be promptly reported to EM-1.

Deliverables: Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).

Due Date: December 31, 2015

Lead: Doug Tonkay, EM-31

Action JON 6.4: EM-30 will incorporate direction to the NTP regarding roles and responsibilities and the internal structure of the NTP. This direction will specify the comprehensive nature of the NTP's oversight role and the need to incorporate internal divisions that provide independence between the programmatic and oversight functions.

Deliverables: Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).

Due Date: December 31, 2015

Lead: Doug Tonkay, EM-31

4.2 JON #30: DOE Headquarters and CBFO need to conduct an extent of condition review of the overall Federal oversight across the DOE complex in all three key segments of the National TRU Program: the Generator Site TRU Waste Program, TRU Waste Certification Program, and the Disposal System Program (WIPP).

Issue Description

The authority of the National Transuranic Program and the expectation that it was responsible for the preparation of TRU waste for disposal at WIPP, including operations at generator sites, was not clearly established. Effective oversight of the generator sites was not routinely evaluated. The AIB has uncovered several examples of ineffective implementation that was not uncovered by either contractor or Federal oversight.

Approach

The Assistant Secretary for the Office of Environmental Management will direct EM Field Managers to conduct a self-assessment of federal oversight of their local TRU waste management and certification programs as a condition for certification to ship waste to WIPP. Separate action by the NTP will track completion of the self-assessments as a requirement for shipping TRU waste to WIPP.

Additional actions beginning with JON 30.2 will develop an EM-30 oversight and assessment program that evaluate the NTP as well as the NTP oversight at TRU generator sites. This will

include implementation of an interim program and development of a final program. The actions of JON 30.6 and JON 30.7 apply to the EM-30 responsibilities for all radioactive waste (not just TRU waste).

Deliverable/Milestone/Due Dates

Objective 1: EM HQ will provide direction to the TRU waste generator sites requiring they complete a self-assessment of Federal oversight.

Objective 2: EM HQ will direct the establishment of the criteria, schedule and processes to assess Federal oversight at the TRU waste generator sites.

Action JON 30.1: EM-30 will draft a letter for EM-1 approval that directs TRU waste generator sites conduct a self-assessment of Federal oversight of the TRU waste program.

Deliverables: An approved EM-1 letter.

Due Date: October 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.2: Develop and approve an interim Federal oversight criteria review and approach document (CRAD) that contains the minimum lines of inquiry for evaluating the TRU waste Federal oversight program.

Deliverables: An EM-31 approved TRU waste CRAD.

Due Date: November 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.3: Identify the staff for the EM-31 TRU waste oversight program.

Deliverables: An EM-31 approved list of staff responsible for the TRU waste oversight program.

Due Date: November 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.4: Develop, approve and implement an interim qualification program for the EM-31 TRU waste oversight program.

Deliverables: An EM-31 approved interim qualification program.

Due Date: November 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.5: Develop and implement an approved assessment schedule for the TRU waste generator sites.

Deliverables: An EM-31 approved interim TRU waste assessment schedule.

Due Date: November 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.6: Develop and approve a Federal oversight criteria review and approach document (CRAD) that contains the minimum lines of inquiry for evaluating the Federal oversight program.

Deliverables: An EM-30 approved CRAD (See Action JON 31.1)

Due Date: October 1, 2016

Lead: Mark Senderling, EM-32

Action JON 30.7: Develop a final EM-30 Federal oversight program

Deliverables: An EM-30 approved Federal oversight program (See Action JON 31.1)

Due Date: October 1, 2016

Lead: Mark Senderling, EM-32

4.3 JON #31: DOE Headquarters needs to develop and implement a DOE O 435.1 comprehensive oversight program for National TRU Program

Issue Description

The authority of the National Transuranic Program and the expectation that it was responsible for the preparation of TRU waste for disposal at WIPP, including operations at generator sites, was not clearly established. Effective oversight of the generator sites was not routinely evaluated. The AIB has uncovered several examples of ineffective implementation that was not uncovered by either contractor or Federal oversight.

Headquarters oversight of the NTP operation was weak and largely focused on program cost and schedule. EM-30 did not routinely evaluate the effectiveness of the NTP in overseeing the operations at the generator sites or the rigor of the NTP processes in ensuring compliance with requirements to ship waste to WIPP for disposal.

Approach

The EM Deputy Assistant Secretary for Waste Management will develop an HQ oversight plan for NTP activities in collaboration with other HQ elements with DOE O. 435.1 oversight

responsibilities for TRU waste. This EM-30 program will be broader than the TRU waste oversight program described in the actions of JON 30.

Deliverable/Milestone/Due Dates

Objective 1: EM HQ will direct the establishment of a DOE oversight program for radioactive waste that meets the expectations of DOE O 435.1.

Action JON 31.1: EM-30 will work with EM-40 to engage AU and EA regarding the oversight requirements for a DOE O 435.1 comprehensive oversight program for the TRU waste program as well as other radioactive waste.

Deliverables: An EM-30 approved oversight plan (see 30.7 above).

Due Date: November 30, 2015

Lead: Mark Senderling, EM-32

4.4 JON #37: The Office of Environmental Management Headquarters needs to ensure that waste generator site's FHAs adequately characterize the fire risks associated with TRU waste packaging during handling and storage.

Issue Description

The use of exposed combustible emplacement materials (e.g., fiberboard and polyethylene slip sheets, polyethylene reinforcement plates, polyethylene stretch wrap, cardboard stiffeners and polypropylene super sack fabric) in the array were fully evaluated, nor was the quantity used fully understood. An evaluation of the combustible emplacement material mass based on fabrication documentation concluded that the actual mass of combustible materials in the array was 40 percent higher than was represented in the Waste Data System.

Approach

NWP, as part of their response to JON 33, is required to complete an evaluation of the exposed combustible materials and to determine the actions required to eliminate any unnecessary materials. NWP will communicate these actions to the waste generator sites. EM-41 will take action to ensure waste generator sites take action on the NWP communication and evaluate the results at the waste generator sites.

Deliverable/Milestone/Due Dates

Objective 1: EM HQ will direct the incorporation of more realistic combustible material information into the site FHAs and will review the site finished products.

Action JON 37.1: EM-40 will prepare a memo, with EM-30 and NTP concurrence directing generator sites review their FHAs and revise as necessary to respond to the NWP external packaging review.

Deliverable: Approved EM-40 memo.

Due Date: November 2, 2015

Lead: Dan Sigg, EM-41 (Acting)

Action 37.2: EM-41 will approve a plan/schedule for the EM-41 review of WG site FHAs after the NWP external packaging guidance has been implemented.

Deliverable: Approved EM-41 schedule.

Due Date: December 1, 2015

Lead: Dan Sigg, EM-41 (Acting)

4.5 JON #40: DOE Headquarters needs to engage safety culture expertise to provide training and mentoring to LANS, ES, and NA-LA management on the principles of a strong safety culture and take appropriate corrective action based on the outcome.

Issue Description

The AIB concluded that LANL, ES and NA-LA management did not welcome critical feedback, did not fully understand the complexities of the hazards and failed to foster an environment where employees felt *comfortable raising safety issues*.

Approach

EM-40 will review the EM contractors at LANL and the EM-LA plans and provide feedback on their approach. EM-40 will provide examples of actions and approaches as well as identify other resources to provide expertise in the development of the corrective actions. The intent is to identify resources that can provide a sustained mentoring effort.

Deliverable/Milestone/Due Dates

Objective 1: EM HQ will review EM contractor and EM-LA safety culture/SCWE plans and identify resources to assist in the execution of their plans.

Action JON 40.1: EM-40 (Julie Goeckner) will prepare a memo to the EM contractors at LANL and the EM-LA management (with a copy to CBFO, NWP, Sandia, and appropriate DAS organizations), which will direct:

The EM contractors at LANL and the EM-LA management to coordinate/submit proposed corrective actions associated with safety culture/SCWE to Ms. Julie Goeckner (EM's Senior Advisor for Nuclear Safety Culture).

Deliverable: Approved EM-40 memo.

Due Date: October 30, 2015

Lead: Julie Goeckner, EM-40

Action JON 40.2: EM-40 (Julie Goeckner) will:

- Identify options for safety culture/SCWE subject matter expertise, resources and tools, and applicable training.
- Evaluate the EM contractors at LANL and the EM-LA proposed corrective actions associated with safety culture/SCWE for consistency with Departmental expectations for establishing and maintaining a positive safety culture/SCWE (e.g., Integrated Safety Management).
- Provide feedback/guidance to the EM contractors at LANL and the EM-LA management regarding the proposed corrective actions, as appropriate.

Deliverable: EM-40 memo correspondence identifying safety culture/SCWE subject matter resources and an evaluation of proposed actions.

Due Date: November 30, 2015

Lead: Julie Goeckner, EM-40

5.0 SUMMARY

The actions described in this CAP address the six Conclusions and five JONs associated with HQ from the Phase 2: Radiological Release Event at the Waste Isolation Pilot Plant AIB Report. The CAP is consistent with the Department's commitment to ISM and draws on the feedback and improvement core function. The Department's Federal HQ employees will assert control of the plan and its actions from initiation to closure and validation of effectiveness. The Department believes these actions are responsive and appropriate for implementing the overall intent of the issues in the investigation report. The actions that resulted from this effort are summarized in Table 1 and the schedule is depicted in Figure 1.

6.0 ORGANIZATION AND MANAGEMENT

The DOE EM-40 Deputy Assistant Secretary for safety, Security and Quality programs is the Responsible Manager for the execution of this CAP. EM-40 will provide a periodic (i.e., quarterly) update of the status of the associated actions to EM-1 and/or EM-2 -via a verbal briefing or email. EM-40 will coordinate the actions identified in this report and track their status and closure on an ongoing basis. To assure the various Department implementing elements and the DNFSB remain informed of the status of the corrective action implementation, the Department will provide progress briefings to the DNFSB and/or DNFSB staff as requested.

Table 1 – Action Summary

Action	Corrective Action	Lead	Deliverable	Due Date
Conclusions #4 - JON #6				
JON 6.1	EM-30 will evaluate the options for a reorganization of the NTP reporting relationship and recommend an option to EM-1 for approval.	Doug Tonkay, EM-31	Approved EM-1 letter that directs the NTP organizational alignment	12/31/15
JON 6.2	EM-30 will generate a letter for EM-1 approval directing that the NTP has the full authority to manage all aspects of TRU waste destined for disposal at WIPP.	Doug Tonkay, EM-31	Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).	12/31/15
JON 6.3	EM-30 will generate a letter to the NTP directing that safe operation of the National TRU Program shall take precedence over schedule and program priorities and that during this transition back to operations, that any issues or conflicts that challenge this directive will be promptly reported to EM-1.	Doug Tonkay, EM-31	Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).	12/31/15
JON 6.4	EM-30 will incorporate direction to the NTP regarding roles and responsibilities and the internal structure of the NTP. This direction will specify the comprehensive nature of the NTP's oversight role and the need to incorporate internal divisions that provide independence between the programmatic and oversight functions.	Doug Tonkay, EM-31	Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).	12/31/15
Conclusions #18- JON #30				
JON 30.1	Action JON 30.1: EM-30 will draft a letter for EM-1 approval that directs TRU waste generator sites conduct a self-assessment of Federal oversight of the TRU waste program.	Doug Tonkay, EM-31	An approved EM-1 letter.	10/30/15

Table 1 – Action Summary

Action	Corrective Action	Lead	Deliverable	Due Date
JON 30.2	Develop and approve an interim Federal oversight criteria review and approach document (CRAD) that contains the minimum lines of inquiry for evaluating the TRU waste Federal oversight program.	Doug Tonkay, EM-31	An EM-31 approved TRU waste CRAD.	11/30/15
JON 30.3	Identify the staff for the EM-31 TRU waste oversight program.	Doug Tonkay, EM-31	An EM-31 approved list of staff responsible for the TRU waste oversight program.	11/30/15
JON 30.4	Develop, approve and implement an interim qualification program for the EM-31 TRU waste oversight program.	Doug Tonkay, EM-31	An EM-31 approved interim qualification program.	11/30/15
JON 30.5	Develop and implement an approved assessment schedule for the TRU waste generator sites.	Doug Tonkay, EM-31	An EM-31 approved interim TRU waste assessment schedule.	11/30/15
JON 30.6	Develop and approve a Federal oversight criteria review and approach document (CRAD) that contains the minimum lines of inquiry for evaluating the Federal oversight program.	Mark Senderling, EM-32	An EM-30 approved CRAD (See Action JON 31.1)	10/01/16
JON 30.7	Develop a final EM-30 Federal oversight program	Mark Senderling, EM-32	An EM-30 approved Federal oversight program (See Action JON 31.1)	10/01/16
Conclusions #19 - JON #31				
JON 31.1	EM-30 will work with EM-40 to engage AU and EA regarding the oversight requirements for a DOE O 435.1 comprehensive oversight program for the TRU waste program as well as other radioactive waste.	Mark Senderling, EM-32	An EM-30 approved oversight plan (see 30.7 above)	11/30/15

Table 1 – Action Summary

Action	Corrective Action	Lead	Deliverable	Due Date
Conclusions #21 - JON #37				
JON 37.1	EM-40 will prepare a memo, with EM-30 and NTP concurrence directing generator sites review their FHAs and revise as necessary to respond to the NWP external packaging review.	Dan Sigg, EM-41 (Acting)	Approved EM-40 memo.	11/2/15
JON 37.2	EM-41 will approve a plan/schedule for the EM-41 review of WG site FHAs after the NWP external packaging guidance has been implemented.	Dan Sigg, EM-41 (Acting)	Approved EM-41 schedule.	12/1/15
Conclusions #24/25 - JON #40				
JON 40.1	<p>EM-40 (Julie Goeckner) will prepare a memo to the EM contractors at LANL and the EM-LA management (with a copy to CBFO, NWP, Sandia, and appropriate DAS organizations), which will direct:</p> <p>The EM contractors at LANL and the EM-LA management to coordinate/submit proposed corrective actions associated with safety culture/SCWE to Ms. Julie Goeckner (EM's Senior Advisor for Nuclear Safety Culture).</p>	Julie Goeckner, EM-40	Approved EM-40 memo.	10/30/15

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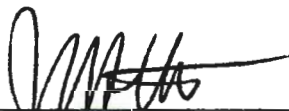
Corrective Action Plan for
Environmental Management Headquarters
*Phase 2: Radiological Release Event at the
Waste Isolation Pilot Plant on
February 14, 2014*



Washington, DC 20585

August 2015

Corrective Action Plan for
Environmental Management Headquarters
*Phase 2: Radiological Release Event at the
Waste Isolation Pilot Plant on
February 14, 2014*



Date:

10/6/15

Prepared by:

James A. Hutton

Deputy Assistant Secretary for

Safety, Security, and Quality Programs

Environmental Management

Date:

Approved by:

Monica Regalbuto

Assistant Secretary

for Environmental Management

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ACRONYMS

AIB	Accident Investigation Board
CAM	Continuous Air Monitor
CAP	Corrective Action Plan
CBFO	Carlsbad Field Office
CFR	Code of Federal Regulations
CMR	Central Monitoring Room
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EM	Office of Environmental Management
EMCBC	Environmental Management Consolidated Business Center
EOC	Emergency Operations Center
FSM	Facility Shift Manager
HEPA	High-Efficiency Particulate Air
HQ	Headquarters
ISM	Integrated Safety Management
JON	Judgment of Need
LANS	Los Alamos National Security, LLC
NA-LA	NNSA Los Alamos Field Office
NNSA	National Nuclear Security Administration
NTP	National Transuranic Program
NWP	Nuclear Waste Partnership, LLC
ORPS	Occurrence Reporting and Processing System
PISA	Potentially Inadequate Safety Analysis
SCWE	Safety Conscious Work Environment
TRU	Transuranic
TSR	Technical Safety Requirements
USQ	Unreviewed Safety Question
WIPP	Waste Isolation Pilot Plant

1.0 PURPOSE

The purpose of this Corrective Action Plan (CAP) is to specify U.S. Department of Energy (DOE) actions for addressing Office of Environmental Management (EM) Headquarters (HQ) issues identified in the *Accident Investigation Report for the Phase 2: Radiological Release Event at the Waste Isolation Pilot Plant (WIPP) on February 14, 2014*. The report identified 24 Conclusions and 40 Judgments of Need (JONs). Six of the Conclusions and five of the JONs were determined to be associated with EM HQ oversight of the operations. As such, EM HQ has taken the action to develop the CAP for those JONs specific to HQ (i.e., JONs 6,30,31,37 and 40). This report documents those corrective actions, along with the responsible office and due dates for completing the actions. The *Phase 2: Radiological Release Event at the Waste Isolation Pilot Plant (WIPP) on February 14, 2014* report identified issues with both EM and National Nuclear Security Administration (NNSA) organizations. The organizations associated with EM activities included EM HQ, Carlsbad Field Office (CBFO), National Transuranic Program (NTP), and Nuclear Waste Partnership, LLC (NWP). The organizations associated with NNSA activities included NNSA HQ, NNSA Los Alamos Field Office (NA-LA) and Los Alamos National Security, LLC (LANS). EM and NNSA jointly established two review teams that evaluated the program issues identified in this report. One review team (Technical Team) concentrated on the technical issues regarding treatment of the waste while a second review team (Management Team) reviewed the issues regarding the organizational problems. The overall approval process for the EM CAPs associated with this event assigns approval responsibility to the next higher authority. Specifically, CBFO will approve the NWP CAP (with EM HQ concurrence); EM HQ Office of Safety, Security, and Quality Programs (EM-40) will approve the CBFO CAP (including the NTP); and EM-1 will approve the EM HQ CAP.

2.0 BACKGROUND

On Friday, February 14, 2014, there was an incident in the underground repository at the DOE Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, which resulted in the release of americium and plutonium from one or more transuranic (TRU) waste containers into the environment. The WIPP is a deep geologic repository, mined out of a thick bed of salt, for the disposal of defense TRU waste generated primarily from the cleanup of DOE sites. The release was detected by an underground continuous air monitor (CAM) and as a result, exhaust ventilation was directed through high-efficiency particulate air (HEPA) filter banks located in the surface exhaust building. However, a measurable portion of the exhaust bypassed the HEPA filters via design leakage through two ventilation system dampers and was discharged directly into the environment from an exhaust duct. No personnel were determined to have received external contamination; however, 21 individuals were identified through bioassay to have initially tested positive for low level amounts of internal contamination as of March 28, 2014. Trace amounts of americium and plutonium were detected off-site.

The review of the causes and response to this event was conducted in two parts. Part one – Phase 1- dealt with the subsequent response. A separate report on Phase 1 has been released and separate corrective action plans for Phase 1 have been developed and approved. Part two (the focus of this CAP) – Phase 2 – covers the direct, contributing and root causes that resulted in a drum in the underground of the WIPP disposal facility to spontaneously react in an uncontrollable manner that resulted in the release of the material. The Accident Investigation

Board (AIB) for Phase 2 began their investigation on May, 19 2014, and completed the Phase 2 investigation on April 16, 2015. This CAP has been prepared in response to the AIB's Phase 2 report Conclusions and JONs.

The specific Conclusions and JONs that were associated with DOE HQ and a summary of the Accident Investigation Report discussions are included in the section below.

Conclusions #4:

Carlsbad Field Office (CBFO) oversight activities associated with the characterization and certification of transuranic (TRU) waste were ineffective in identifying programmatic weaknesses through the execution of certification audits and surveillances at LANL.

JON #6: DOE Headquarters needs to review expectations documented in existing National TRU Program policy directives and take action necessary to clearly assert that CBFO, as the manager of the WIPP repository, has the authority to conduct oversight of waste generator site programs and processes necessary to provide assurance that any activities that could impact characterization and certification of waste are verified to be compliant.

CBFO, through oversight of the National TRU Program certification audits, assumed that local oversight was being effectively conducted as prescribed in the responsibilities identified in the WAC. CBFO did not effectively ensure (1) that LANS prepared implementation documentation and programs that met the requirements and criteria in the WAC, and (2) that TRU waste accepted for management and disposal at WIPP complied with the WIPP HWFP, applicable laws, and regulations as described in the WAC. CBFO personnel associated with the National TRU Program indicated in interviews that they did not have the authority to conduct oversight of the waste generator site activities beyond the Central Characterization Program (CCP) conducted characterization and certification processes, although the DOE Accident Investigation Board could find no evidence that such authority was limited. Key elements of the treatment and repackaging activities were not effectively evaluated during certification audits. Without effective oversight being conducted by the local field office, the gap in the oversight being performed by CBFO allowed fundamental flaws in the repackaging and treatment processes to continue unchecked. The Board also identified that since the advent of the CCP organization that, although meeting the stated requirements in the permit, the certification audit scope had degraded in focus and did not take a critical look at waste generator activities that were important to the characterization process.

Conclusions #18:

The Federal roles, responsibilities and execution for oversight of the activities between the generator site transuranic (TRU) waste program (LANL) and the TRU Waste Central Characterization Program (CCP) were inadequate.

JON #30: DOE Headquarters and CBFO need to conduct an extent of condition review of the overall Federal oversight across the DOE complex in all three key segments of the National TRU Program: the Generator Site TRU Waste Program, TRU Waste Certification Program, and the Disposal System Program (WIPP).

The Board noted that there is a gap in Federal oversight performance between CBFO National TRU Program and NA-LA of waste site activities. The Board observed that NA-LA oversight focused more on budget and schedule performance versus operational oversight. The Board also noted a lack of clearly defined Federal interface roles and responsibilities, and expectations between the LANL/generator site TRU waste program and the TRU waste certification program (CCP). Additionally, the Board identified inadequate CCP review and approval of waste management operating procedures/process changes, e.g., WCRRF glovebox operating procedure and inadequate Federal oversight of those processes.

Conclusion #19

DOE Headquarters did not perform DOE O 435.1, *Radioactive Waste Management*, oversight activities for implementation of requirements associated with the operational performance within the National Transuranic (TRU) Program.

JON #31: DOE Headquarters needs to develop and implement a DOE O 435.1 comprehensive oversight program for National TRU Program

The Board found no objective evidence of DOE Headquarters oversight activities for implementation of DOE O 435.1 requirements associated with the operational performance within the National TRU Program.

Conclusions #21:

The WIPP Fire Hazard Analysis (FHA) was ineffective in identifying and analyzing the potential for a fire starting within the waste array, as well as the potential for fire propagation within the array.

JON #37: The Office of Environmental Management Headquarters needs to ensure that waste generator site's FHAs adequately characterize the fire risks associated with TRU waste packaging during handling and storage.

The use of exposed combustible emplacement materials (e.g., fiberboard and polyethylene slip sheets, polyethylene reinforcement plates, polyethylene stretch wrap, cardboard stiffeners and polypropylene super sack fabric) in the array was not fully evaluated, nor was the quantity used fully understood. An evaluation of the combustible emplacement material mass based on fabrication documentation concluded that the actual mass of combustible materials in the array was 40 percent higher than was represented in the Waste Data System. NWP missed an opportunity to recognize and correct this error in 2011 when the Defense Nuclear Facilities Safety Board issued a letter dated June 24, 2011, to the Assistant Secretary for Environmental Management (sir_2011624_12300_18) with the attached Staff Issue Report, dated May 2, 2011, that identified the hazard associated with the MgO super sacks and other interstitial materials.

Conclusions #24/25:

Los Alamos National Security, LLC (LANS), Energy Solutions, LLC (ES) and NNSA Los Alamos Field Office (NA-LA) allowed the safety culture at the Los Alamos National Laboratory (LANL) to deteriorate within pockets of the organization as evidenced by the workers' feedback that they did not feel comfortable identifying issues that may adversely affect management direction, delay mission-related objectives, or otherwise affect cost or schedule. In addition, management failed to effectively respond to workers' issues regarding unexpected conditions, i.e., generation of smoke and foaming, encountered during waste processing activities.

Questioning attitudes were not welcomed by management and many issues and hazards did not appear to be readily recognized by site personnel

JON #40: DOE Headquarters needs to engage safety culture expertise to provide training and mentoring to LANS, ES, and NA-LA management on the principles of a strong safety culture and take appropriate corrective action based on the outcome.

The Board analyzed the various survey results coupled with several of the interviews and hotline feedback and perceived that LANL, NA-LA, and ES management did not welcome critical feedback, lacked credibility with the workforce, did not fully understand the complexities and hazards related to waste processing, did not effectively flow down expectations, and have fostered a culture where employees do not feel comfortable raising safety issues to management. As a contributing factor, WCRRF management did not effectively respond to worker questions when presented with unexpected issues during the process (e.g. foaming of waste, orange/yellow smoke in the glovebox, or adding items to the waste stream such as glovebox gloves). Interview results also identified that several of the managers and workers involved in the processing of the waste did not fully understand the complexities or hazards associated with the waste they were handling. It was not evident to the Board that these types of issues were openly discussed during senior management or work planning meetings. Significant changes to the processes for MIN02 repackaging (changes in the use of absorbents and neutralizing agents) were not adequately discussed or considered at these forums. This represents a lost opportunity to use the resources at LANL to address issues before they became problems. The Board perceived a reluctance of the Federal staff to identify areas of excessive workload to management and the adverse impact on their ability to provide adequate oversight. This is especially evident in the areas of waste management and RCRA compliance.

3.0 UNDERLYING CAUSES

The Board concluded that the direct cause of the accident was an exothermic reaction of incompatible materials placed into a LANL waste drum that resulted in a runaway exothermic reaction that lead to drum over-pressurization and release of a portion of the drum's contents. The root cause of the event was determined a failure of LANS to understand and effectively implement the LANL Hazardous Waste Facility Permit and that NA-LA and the NTP had failed to ensure that LANL adequately developed and implemented the required treatment procedures and incorporated the required rigor into those processes. The Board also identified twelve contributing causes.

As part of the AIB report, the team identified direct, root, and contributing causes for the radiological release event. The results from the investigation report are summarized here and discussed in more detail in the report.

Direct Cause – the immediate events or conditions that caused the accident.

The Board identified the direct cause of this accident to be an exothermic reaction of incompatible materials in LANL waste drum 68660 that led to thermal runaway, which resulted in over-pressurization of the drum, breach of the drum, and release of a portion of the drum's contents (combustible gases, waste, and wheat-based absorbent) into the WIPP underground. The Board reached this conclusion based on post-event forensic and fire analyses that determined that:

- Isotopic ratios in air sample media analyzed post-event are consistent with drum 68660 which is unique from other drums in the area of the release.
- The contents of waste drum 68660 included incompatible materials which created the potential for an exothermic reaction.
- Waste drum 68660 was the only waste container with an identified breach.
- The visual evidence associated with the identified breach was consistent with an exothermic reaction within drum 68660. This reaction resulted in internal heating of the drum that led to internal pressure buildup of combustible gases within the drum which exceeded the drum venting capacity. The drum lid extruded beyond the lid retention ring, deflected the lid, and resulted in rapid release of the materials from the drum. The combustible gases and solids ignited which then spread to other combustible materials within the waste array, i.e., fiberboard and polyethylene slip sheets, reinforcement plates, stretch wrap, cardboard stiffeners and polypropylene super sack fabric.

Root Cause – causal factors that, if corrected, would prevent recurrence of the same or similar accidents.

Root causes can be local (specific to the one accident), and/or systemic (common to a broad class of similar accidents). For this accident, the Board identified both local and systemic root causes.

Local Root Cause: A specific deficiency that, if corrected, would prevent recurrence of the same accident.

The Board identified the local root cause of the radioactive material release in the WIPP underground to be the failure of LANS to understand and effectively implement the LANL Hazardous Waste Facility Permit and Carlsbad Field Office directed controls. Specifically, LANL's use of organic, wheat-based absorbent instead of the directed inorganic absorbent such as kitty litter/zeolite clay absorbent in the glovebox operations procedure for nitrate salts resulted in the generation, shipment, and emplacement of a noncompliant, ignitable waste form.

Systemic Root Cause: A deficiency in a management system that, if corrected, would prevent the occurrence of a class of accidents, e.g., operational accidents caused by procedural deficiencies. The Board identified the systemic root cause as the Los Alamos Field Office (NA-LA) and National Transuranic Program/Carlsbad Field Office (CBFO) failure to ensure that

LANL had adequately developed and implemented repackaging and treatment procedures that incorporated suitable hazard controls and included a rigorous review and approval process. NA-LA and CBFO did not ensure the adequate flow down of the Resource Conservation and Recovery Act and other upper tier requirements, including the WIPP Hazardous Waste Facility Permit, Attachment C, Waste Analysis Plan, WIPP Waste Acceptance Criteria, and the LANL Hazardous Waste Facility Permit requirements into operating procedures at LANL.

Contributing Causes – events or conditions that collectively with other causes increased the likelihood or severity of an accident but that individually did not cause the accident. For the purposes of this investigation, contributing causes include those related to the cause of the radiological release to the environment, as well as those related to the subsequent response.

The Board identified twelve contributing causes to the radiological release investigated in Phase 2:

1. Failure of Los Alamos National Security, LLC (LANS) to implement effective processes for procedure development, review, and change control. Execution of the Waste Characterization, Reduction, and Repackaging Facility (WCRRF) glovebox procedure resulted in a combination of incompatible materials and the generation of an ignitable, noncompliant waste.
2. Failure of Los Alamos National Security, LLC (LANS) to develop and implement adequate processes for hazard identification and control. As a result, an incompatible absorbent was specified and used during nitrate salt bearing waste processing.
3. Failure of the Los Alamos National Security, LLC (LANS) Contractor Assurance System (CAS) to identify weaknesses in the processes for operating procedure development; hazard analysis and control; and review that resulted in an inadequate glovebox operation procedure for processing the nitrate salt bearing waste.
4. 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) glovebox procedure. The addition of a secondary waste material was not adequately considered.
5. Failure of Los Alamos Field Office (NA-LA) and the National Transuranic (TRU) Program/Carlsbad Field Office (CBFO) to ensure that the CCP and LANS complied with Resource Conservation and Recovery Act (RCRA) requirements in the WIPP Hazardous Waste Facility Permit (HWFP) and the LANL HWFP, as well as the WIPP Waste Acceptance Criteria (WAC). Examples include the unapproved treatment (neutralization and absorption of liquids) and the addition of incompatible materials. As a result, waste containing incompatible materials was generated and sent to WIPP.
6. Failure of Los Alamos National Security, LLC (LANS), EnergySolutions, LLC (ES), and the NNSA Los Alamos Field Office (NA-LA) to ensure that a strong safety culture existed Los Alamos National Laboratory (LANL). As a result, although there was a questioning attitude, there was a failure to adequately resolve employee concerns which could have identified the generation of noncompliant waste prior to shipment.
7. Failure of the execution of the LANL Unreviewed Safety Question (USQ) process to identify the lack of a hazard analysis of the proposed changes to the Waste Characterization, Reduction,

and Repackaging Facility (WCRRF) glovebox waste repackaging procedure (i.e., consistent with Integrated Safety Management (ISM) core functions]), and to recognize that an incompatible reactive nitrate salt bearing waste would be created by using “organic” absorbents. As a result, the Unreviewed Safety Question Determination (USQD) did not ensure that nuclear safety basis documents, including the WCRRF and Area G Basis for Interim Operation (BIO), were updated to evaluate hazards associated with material incompatibility in the nitrate salt-bearing waste stream and to specify preventive or mitigative controls.

8. Failure of NNSA Los Alamos Field Office (NA-LA) to establish and implement adequate line management oversight programs and processes in accordance with DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*. As a result, weaknesses in Los Alamos National Security, LLC (LANS)/ Energy Solutions, LLC (ES) programs and waste operations procedures were not identified and corrected which allowed an ignitable, noncompliant nitrate salt-bearing waste to be generated, shipped, and emplaced at WIPP.

9. Failure of DOE Headquarters to perform adequate or effective line management oversight required by DOE Order 435.1, *Radioactive Waste Management*, dated July 9, 1999. As a result, waste containing incompatible materials was generated and sent to WIPP.

10. 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.

11. Failure of Los Alamos National Security, LLC (LANS)/Energy Solutions, LLC (ES) to adequately train and qualify ES operators and supervisors in the identification and control of incompatible materials during waste processing. As a result, personnel did not question the instruction to add organic absorbent and other secondary waste items to the nitrate salt bearing waste.

12. Failure of Energy Solutions, LLC (ES) operators and Los Alamos National Security, LLC (LANS)/ES supervisors to effectively execute the stop work process when unexpected conditions, including foaming reactions and smoke during waste processing, were encountered at Waste Characterization, Reduction, and Repackaging Facility (WCRRF). This resulted in waste containing incompatible materials being generated and sent to WIPP.

4.0 ISSUE RESOLUTION/CORRECTIVE ACTIONS

EM HQ will provide Federal staff to direct, track and validate the specific corrective actions in this plan. The “Lead” designated in the following actions is intended to indicate the individual responsible for coordinating that action. Other EM offices will be involved in the corrective action closure. The EM-40 office will collect a status of the actions identified in this plan and will provide a verbal or written status report to EM-1/2 as requested, at a minimum of once per quarter.

4.1 JON #6: DOE Headquarters needs to review expectations documented in existing National TRU Program policy directives and take action necessary to clearly assert that CBFO, as the manager of the WIPP repository, has the authority to conduct oversight of waste generator site programs and processes necessary to provide assurance that any activities that could impact characterization and certification of waste are verified to be compliant.

Issue Description

The authority of the National Transuranic Program and the expectation that it was responsible for the preparation of TRU waste for disposal at WIPP, including operations at generator sites, was not clearly established. The NTP did not have a comprehensive program to evaluate the preparation for all waste streams for disposal at WIPP. Waste streams that were evaluated were not subjected to a rigorous program to ensure the correct process to treat the waste was carried out at the generator sites. In addition, EM/HQ expectation of roles and responsibilities for the National Transuranic Program were not clearly communicated DOE-wide. The NTP, in some cases, applied more resources to the scheduling aspects of managing the TRU waste program than the oversight aspects of the program.

Approach

The EM Deputy Assistant Secretary for Waste Management will develop and recommend to the Assistant Secretary for the Office of Environmental Management a policy on roles, responsibilities, authorities, and accountability for the management of the National TRU Program (including National TRU Program authority at TRU waste generator sites). EM HQ will issue directives to the generator sites asserting the NTP authority to review, approve and oversee generator site processing of TRU waste for disposal at WIPP.

Deliverable/Milestone/Due Dates

Objective 1: DOE HQ will take action to establish an NTP organization that has the assets to oversee the Transuranic waste program throughout the DOE and has the authority to oversee preparation of TRU waste at any generator site in the DOE that is ultimately planned for disposal at WIPP.

Action JON 6.1: EM-30 will evaluate the options for a NTP reporting relationship and recommend an option to EM-1 for approval.

Deliverables: Approved EM-1 letter that directs the NTP organizational alignment.

Due December 31, 2015

Lead: Doug Tonkay, EM-31

Action JON 6.2: EM-30 will generate a letter for EM-1 approval directing that the NTP has the full authority to manage all aspects of TRU waste destined for disposal at WIPP.

Deliverables: Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).

Due Date: December 31, 2015

Lead: Doug Tonkay, EM-31

Action JON 6.3: EM-30 will generate a letter to the NTP directing that safe operation of the National TRU Program shall take precedence over schedule and program priorities and that during this transition back to operations, that any issues or conflicts that challenge this directive will be promptly reported to EM-1.

Deliverables: Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).

Due Date: December 31, 2015

Lead: Doug Tonkay, EM-31

Action JON 6.4: EM-30 will incorporate direction to the NTP regarding roles and responsibilities and the internal structure of the NTP. This direction will specify the comprehensive nature of the NTP's oversight role and the need to incorporate internal divisions that provide independence between the programmatic and oversight functions.

Deliverables: Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).

Due Date: December 31, 2015

Lead: Doug Tonkay, EM-31

4.2 JON #30: DOE Headquarters and CBFO need to conduct an extent of condition review of the overall Federal oversight across the DOE complex in all three key segments of the National TRU Program: the Generator Site TRU Waste Program, TRU Waste Certification Program, and the Disposal System Program (WIPP).

Issue Description

The authority of the National Transuranic Program and the expectation that it was responsible for the preparation of TRU waste for disposal at WIPP, including operations at generator sites, was not clearly established. Effective oversight of the generator sites was not routinely evaluated. The AIB has uncovered several examples of ineffective implementation that was not uncovered by either contractor or Federal oversight.

Approach

The Assistant Secretary for the Office of Environmental Management will direct EM Field Managers to conduct a self-assessment of federal oversight of their local TRU waste management and certification programs as a condition for certification to ship waste to WIPP. Separate action by the NTP will track completion of the self-assessments as a requirement for shipping TRU waste to WIPP.

Additional actions beginning with JON 30.2 will develop an EM-30 oversight and assessment program that evaluate the NTP as well as the NTP oversight at TRU generator sites. This will

include implementation of an interim program and development of a final program. The actions of JON 30.6 and JON 30.7 apply to the EM-30 responsibilities for all radioactive waste (not just TRU waste).

Deliverable/Milestone/Due Dates

Objective 1: EM HQ will provide direction to the TRU waste generator sites requiring they complete a self-assessment of Federal oversight.

Objective 2: EM HQ will direct the establishment of the criteria, schedule and processes to assess Federal oversight at the TRU waste generator sites.

Action JON 30.1: EM-30 will draft a letter for EM-1 approval that directs TRU waste generator sites conduct a self-assessment of Federal oversight of the TRU waste program.

Deliverables: An approved EM-1 letter.

Due Date: October 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.2: Develop and approve an interim Federal oversight criteria review and approach document (CRAD) that contains the minimum lines of inquiry for evaluating the TRU waste Federal oversight program.

Deliverables: An EM-31 approved TRU waste CRAD.

Due Date: November 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.3: Identify the staff for the EM-31 TRU waste oversight program.

Deliverables: An EM-31 approved list of staff responsible for the TRU waste oversight program.

Due Date: November 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.4: Develop, approve and implement an interim qualification program for the EM-31 TRU waste oversight program.

Deliverables: An EM-31 approved interim qualification program.

Due Date: November 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.5: Develop and implement an approved assessment schedule for the TRU waste generator sites.

Deliverables: An EM-31 approved interim TRU waste assessment schedule.

Due Date: November 30, 2015

Lead: Doug Tonkay, EM-31

Action JON 30.6: Develop and approve a Federal oversight criteria review and approach document (CRAD) that contains the minimum lines of inquiry for evaluating the Federal oversight program.

Deliverables: An EM-30 approved CRAD (See Action JON 31.1)

Due Date: October 1, 2016

Lead: Mark Senderling, EM-32

Action JON 30.7: Develop a final EM-30 Federal oversight program

Deliverables: An EM-30 approved Federal oversight program (See Action JON 31.1)

Due Date: October 1, 2016

Lead: Mark Senderling, EM-32

4.3 JON #31: DOE Headquarters needs to develop and implement a DOE O 435.1 comprehensive oversight program for National TRU Program

Issue Description

The authority of the National Transuranic Program and the expectation that it was responsible for the preparation of TRU waste for disposal at WIPP, including operations at generator sites, was not clearly established. Effective oversight of the generator sites was not routinely evaluated. The AIB has uncovered several examples of ineffective implementation that was not uncovered by either contractor or Federal oversight.

Headquarters oversight of the NTP operation was weak and largely focused on program cost and schedule. EM-30 did not routinely evaluate the effectiveness of the NTP in overseeing the operations at the generator sites or the rigor of the NTP processes in ensuring compliance with requirements to ship waste to WIPP for disposal.

Approach

The EM Deputy Assistant Secretary for Waste Management will develop an HQ oversight plan for NTP activities in collaboration with other HQ elements with DOE O. 435.1 oversight

responsibilities for TRU waste. This EM-30 program will be broader than the TRU waste oversight program described in the actions of JON 30.

Deliverable/Milestone/Due Dates

Objective 1: EM HQ will direct the establishment of a DOE oversight program for radioactive waste that meets the expectations of DOE O 435.1.

Action JON 31.1: EM-30 will work with EM-40 to engage AU and EA regarding the oversight requirements for a DOE O 435.1 comprehensive oversight program for the TRU waste program as well as other radioactive waste.

Deliverables: An EM-30 approved oversight plan (see 30.7 above).

Due Date: November 30, 2015

Lead: Mark Senderling, EM-32

4.4 JON #37: The Office of Environmental Management Headquarters needs to ensure that waste generator site's FHAs adequately characterize the fire risks associated with TRU waste packaging during handling and storage.

Issue Description

The use of exposed combustible emplacement materials (e.g., fiberboard and polyethylene slip sheets, polyethylene reinforcement plates, polyethylene stretch wrap, cardboard stiffeners and polypropylene super sack fabric) in the array were fully evaluated, nor was the quantity used fully understood. An evaluation of the combustible emplacement material mass based on fabrication documentation concluded that the actual mass of combustible materials in the array was 40 percent higher than was represented in the Waste Data System.

Approach

NWP, as part of their response to JON 33, is required to complete an evaluation of the exposed combustible materials and to determine the actions required to eliminate any unnecessary materials. NWP will communicate these actions to the waste generator sites. EM-41 will take action to ensure waste generator sites take action on the NWP communication and evaluate the results at the waste generator sites.

Deliverable/Milestone/Due Dates

Objective 1: EM HQ will direct the incorporation of more realistic combustible material information into the site FHAs and will review the site finished products.

Action JON 37.1: EM-40 will prepare a memo, with EM-30 and NTP concurrence directing generator sites review their FHAs and revise as necessary to respond to the NWP external packaging review.

Deliverable: Approved EM-40 memo.

Due Date: November 2, 2015

Lead: Dan Sigg, EM-41 (Acting)

Action 37.2: EM-41 will approve a plan/schedule for the EM-41 review of WG site FHAs after the NWP external packaging guidance has been implemented.

Deliverable: Approved EM-41 schedule.

Due Date: December 1, 2015

Lead: Dan Sigg, EM-41 (Acting)

4.5 JON #40: DOE Headquarters needs to engage safety culture expertise to provide training and mentoring to LANS, ES, and NA-LA management on the principles of a strong safety culture and take appropriate corrective action based on the outcome.

Issue Description

The AIB concluded that LANL, ES and NA-LA management did not welcome critical feedback, did not fully understand the complexities of the hazards and failed to foster an environment where employees felt *comfortable raising safety issues*.

Approach

EM-40 will review the EM contractors at LANL and the EM-LA plans and provide feedback on their approach. EM-40 will provide examples of actions and approaches as well as identify other resources to provide expertise in the development of the corrective actions. The intent is to identify resources that can provide a sustained mentoring effort.

Deliverable/Milestone/Due Dates

Objective 1: EM HQ will review EM contractor and EM-LA safety culture/SCWE plans and identify resources to assist in the execution of their plans.

Action JON 40.1: EM-40 (Julie Goeckner) will prepare a memo to the EM contractors at LANL and the EM-LA management (with a copy to CBFO, NWP, Sandia, and appropriate DAS organizations), which will direct:

The EM contractors at LANL and the EM-LA management to coordinate/submit proposed corrective actions associated with safety culture/SCWE to Ms. Julie Goeckner (EM's Senior Advisor for Nuclear Safety Culture).

Deliverable: Approved EM-40 memo.

Due Date: October 30, 2015

Lead: Julie Goeckner, EM-40

Action JON 40.2: EM-40 (Julie Goeckner) will:

- Identify options for safety culture/SCWE subject matter expertise, resources and tools, and applicable training.
- Evaluate the EM contractors at LANL and the EM-LA proposed corrective actions associated with safety culture/SCWE for consistency with Departmental expectations for establishing and maintaining a positive safety culture/SCWE (e.g., Integrated Safety Management).
- Provide feedback/guidance to the EM contractors at LANL and the EM-LA management regarding the proposed corrective actions, as appropriate.

Deliverable: EM-40 memo correspondence identifying safety culture/SCWE subject matter resources and an evaluation of proposed actions.

Due Date: November 30, 2015

Lead: Julie Goeckner, EM-40

5.0 SUMMARY

The actions described in this CAP address the six Conclusions and five JONs associated with HQ from the Phase 2: Radiological Release Event at the Waste Isolation Pilot Plant AIB Report. The CAP is consistent with the Department's commitment to ISM and draws on the feedback and improvement core function. The Department's Federal HQ employees will assert control of the plan and its actions from initiation to closure and validation of effectiveness. The Department believes these actions are responsive and appropriate for implementing the overall intent of the issues in the investigation report. The actions that resulted from this effort are summarized in Table 1 and the schedule is depicted in Figure 1.

6.0 ORGANIZATION AND MANAGEMENT

The DOE EM-40 Deputy Assistant Secretary for safety, Security and Quality programs is the Responsible Manager for the execution of this CAP. EM-40 will provide a periodic (i.e., quarterly) update of the status of the associated actions to EM-1 and/or EM-2 -via a verbal briefing or email. EM-40 will coordinate the actions identified in this report and track their status and closure on an ongoing basis. To assure the various Department implementing elements and the DNFSB remain informed of the status of the corrective action implementation, the Department will provide progress briefings to the DNFSB and/or DNFSB staff as requested.

Table 1 – Action Summary

Action	Corrective Action	Lead	Deliverable	Due Date
Conclusions #4 - JON #6				
JON 6.1	EM-30 will evaluate the options for a reorganization of the NTP reporting relationship and recommend an option to EM-1 for approval.	Doug Tonkay, EM-31	Approved EM-1 letter that directs the NTP organizational alignment	12/31/15
JON 6.2	EM-30 will generate a letter for EM-1 approval directing that the NTP has the full authority to manage all aspects of TRU waste destined for disposal at WIPP.	Doug Tonkay, EM-31	Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).	12/31/15
JON 6.3	EM-30 will generate a letter to the NTP directing that safe operation of the National TRU Program shall take precedence over schedule and program priorities and that during this transition back to operations, that any issues or conflicts that challenge this directive will be promptly reported to EM-1.	Doug Tonkay, EM-31	Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).	12/31/15
JON 6.4	EM-30 will incorporate direction to the NTP regarding roles and responsibilities and the internal structure of the NTP. This direction will specify the comprehensive nature of the NTPs oversight role and the need to incorporate internal divisions that provide independence between the programmatic and oversight functions.	Doug Tonkay, EM-31	Approved EM-1 letter (content incorporated into the deliverable for Action JON 6.1).	12/31/15
Conclusions #18- JON #30				
JON 30.1	Action JON 30.1: EM-30 will draft a letter for EM-1 approval that directs TRU waste generator sites conduct a self-assessment of Federal oversight of the TRU waste program.	Doug Tonkay, EM-31	An approved EM-1 letter.	10/30/15

Table 1 – Action Summary

Action	Corrective Action	Lead	Deliverable	Due Date
JON 30.2	Develop and approve an interim Federal oversight criteria review and approach document (CRAD) that contains the minimum lines of inquiry for evaluating the TRU waste Federal oversight program.	Doug Tonkay, EM-31	An EM-31 approved TRU waste CRAD.	11/30/15
JON 30.3	Identify the staff for the EM-31 TRU waste oversight program.	Doug Tonkay, EM-31	An EM-31 approved list of staff responsible for the TRU waste oversight program.	11/30/15
JON 30.4	Develop, approve and implement an interim qualification program for the EM-31 TRU waste oversight program.	Doug Tonkay, EM-31	An EM-31 approved interim qualification program.	11/30/15
JON 30.5	Develop and implement an approved assessment schedule for the TRU waste generator sites.	Doug Tonkay, EM-31	An EM-31 approved interim TRU waste assessment schedule.	11/30/15
JON 30.6	Develop and approve a Federal oversight criteria review and approach document (CRAD) that contains the minimum lines of inquiry for evaluating the Federal oversight program.	Mark Senderling, EM-32	An EM-30 approved CRAD (See Action JON 31.1)	10/01/16
JON 30.7	Develop a final EM-30 Federal oversight program	Mark Senderling, EM-32	An EM-30 approved Federal oversight program (See Action JON 31.1)	10/01/16
Conclusions #19 - JON #31				
JON 31.1	EM-30 will work with EM-40 to engage AU and EA regarding the oversight requirements for a DOE O 435.1 comprehensive oversight program for the TRU waste program as well as other radioactive waste.	Mark Senderling, EM-32	An EM-30 approved oversight plan (see 30.7 above)	11/30/15

Table 1 – Action Summary

Action	Corrective Action	Lead	Deliverable	Due Date
Conclusions #21 - JON #37				
JON 37.1	EM-40 will prepare a memo, with EM-30 and NTP concurrence directing generator sites review their FHAs and revise as necessary to respond to the NWP external packaging review.	Dan Sigg, EM-41 (Acting)	Approved EM-40 memo.	11/2/15
JON 37.2	EM-41 will approve a plan/schedule for the EM-41 review of WG site FHAs after the NWP external packaging guidance has been implemented.	Dan Sigg, EM-41 (Acting)	Approved EM-41 schedule.	12/1/15
Conclusions #24/25 - JON #40				
JON 40.1	<p>EM-40 (Julie Goeckner) will prepare a memo to the EM contractors at LANL and the EM-LA management (with a copy to CBFO, NWP, Sandia, and appropriate DAS organizations), which will direct:</p> <p>The EM contractors at LANL and the EM-LA management to coordinate/submit proposed corrective actions associated with safety culture/SCWE to Ms. Julie Goeckner (EM's Senior Advisor for Nuclear Safety Culture).</p>	Julie Goeckner, EM-40	Approved EM-40 memo.	10/30/15

Table 1 – Action Summary

Action	Corrective Action	Lead	Deliverable	Due Date
JON 40.2	<p>EM-40 (Julie Goeckner) will:</p> <ul style="list-style-type: none"> Identify options for safety culture/SCWE subject matter expertise, resources and tools, and applicable training; Evaluate the EM contractors at LANL and the EM-LA proposed corrective actions associated with safety culture/SCWE for consistency with Departmental expectations for establishing and maintaining a positive safety culture/SCWE (e.g., Integrated Safety Management); Provide feedback/guidance to the EM contractors at LANL and the EM-LA management regarding the proposed corrective actions, as appropriate. 	Julie Goeckner, EM-40	EM-40 memo correspondence identifying safety culture/SCWE subject matter resources and an evaluation of the proposed actions.	11/30/15

Figure 1 – Schedule Summary

Figure 1 – Schedule Summary

Task	Office	ID#	2014	2015												2016												2017				
			D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
EM-30 evaluate options for NTP	EM-31	JON 6.1										Change in direction has the potential to impact CBFO JON 5																				
EM-30 letter for EM-1 approval authorizing NTP	EM-31	JON 6.2																														
EM-30 letter on NTP priorities	EM-31	JON 6.3																														
EM-30 letter for EM-1 approval on NTP R&R and internal structure	EM-31	JON 6.4										Delay of this action has the potential to impact CBFO JON 5																				
EM-1 letter for generator site self-assessment of Federal oversight	EM-31	JON 30.1																														
EM-30 Interim oversight CRAO	EM-31	JON 30.2																														
Identify EM-30 oversight staff	EM-31	JON 30.3																														
Implement EM-31 Interim oversight program	EM-31	JON 30.4																														
Implement assessment schedule for generator sites	EM-31	JON 30.5																														
Approve LOIs for evaluating Federal oversight	EM-31	JON 30.6																														
Develop the final EM-30 federal oversight program	EM-31	JON 30.7																														
Develop a DOE 435.1 oversight program with EA and AU	EM-32	JON 31.1																														
EM-40 memo to generator sites regarding revising FHAs	EM-41	JON 37.1																														
EM-41 approved schedule to review generator site FHAs	EM-41	JON 37.2																														
EM-40 memo to IANs/EM and NA-LA to submit safety culture plans for review	EM-40	JON 40.1																														

Figure 1 – Schedule Summary

Task	Office	ID#	2014	2015												2016												2017				
			D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
EM-40 evaluation of safety culture plans and identification of SME and resources	EM-40	JON 40.2																														

**Place holders - specific due date depends on completion of previous actions.*