

### LA-UR-15-29568

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# **LANS Corrective Action Plan**

WIPP Accident Investigation Board Report

December 18, 2015

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### Background

- AIB Report issued on April 16, 2015
  - 40 Judgements of Need
  - 17 require corrective actions from LANS
- Five corrective action plans
  - LANL (LANS, NA-LA/EM-LA)
  - WIPP (NWP, CBFO)
  - DOE-EM HQ







## **Review of LANL Preparations**

- Established Integrated Corrective Actions Team (ICAT)
- Established Institutional Management Review Board (IMRB)
- Considerable pre-work on many of the corrective actions based on earlier investigation reports [IG, ACO, LANS Root Cause Analysis (RCA)]
- ICAT, IMRB have been very active since AIB release
- Federal counterparts have been engaged throughout the CAP development process
- Significant coordination with other CAP teams

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### **Overall Philosophy**

- Rely on approved WIPP CAPs for format, content, levelof detail, approach and lessons learned
- Incorporate AIB Report details that expand on the individual JON statements
- Carefully craft the words in the action statements and deliverables to minimize room for interpretation
- Assure that actions can be implemented with available resources (or resource needs are identified)
  - Many of the actions have been anticipated and are incorporated in the EM program plans



### **Cross-Walk Matrix**

AIB JON	RCA	ACO	IG	OE
9: Secondary Waste				
10: Requirements Flow Down				
13,18: RNS Technical Basis				
14: Change Control				
15,16,17: WCRR Procedure				
19, 20, 21: Safety Basis				
22, 23: USQ				
25: Contractor Assurance / QA				
32: Procedure Development				
38: Training and Qualification				
39: ISMS/Safety Culture				
(Not in AIB JONs)*	7: Parent Culture	1,4,5,6,7,8		

\* Address outside of AIB response

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### **Approach to CAP Development**



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### **Types of Corrective Actions**

Addressing Systemic Issues JON 14: Process Engineering / Change Control (ADEP) JON 32: Procedure Development (ADEP) JON 39: Safety Culture (DEP DIR)

Improving Requirements Definition

JON 9,10: RCRA Requirements (ADESH) JON 13,18: RNS Tech Basis (ADEP) JON 19, 20, 21: Safety Basis (ADNHHO)

Implementing Improvements

JON 15,16,17: WCRRF GB Procedure (ADEP) JON 38: Training and Qualification (ADEP)

Ensuring Compliance

JON 22, 23: USQ (ADNHHO) JON 25: CAS/QA (ADBI)

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### JON 14: Engineering Change Control Process (ADEP)

- <u>Conclusion</u>: LANS did not utilize a formal engineering change control process to develop modifications to repackaging activities in the WCRR Facility
- JON 14: LANS needs to implement an effective engineering change control process that includes defensible technical bases to justify process modifications
- <u>Approach</u>: Establish integrated process engineering function in ADEP Waste Processing to assure adequate technical baselines, formal change control and configuration management



### **JON 14 Corrective Actions**



14-1	Develop documented new activity and change control process within	ADEP	11/06/15	
14-1	ADEP		11/00/15	
	Define membership and charter a Waste Processing Change Control		/ /	
14-2	Board in ADEP, including senior managers from ADEP, ADNHHO, and ADESH	ADEP	11/06/15	
44.0	Standup "Waste Process Engineering Group " in ADEP, responsible for		0/00/45	
14-3	establishing process baselines and configuration control	ADEP	8/06/15	
	Develop a Waste Process Engineer description, and on-board (hire		44/00/45	
14-4	and qualify) MIN02 Process Engineer	ADEP	11/06/15	
14-5	Establish waste process engineering requirements for application to	ADEP	10/02/15	
	specific waste streams		10,02,10	
	Develop, approve, and issue process flow sheet development		40/00/45	
14-6	procedure that identifies critical steps, specifications and controls, and operational records requirements.	ADEP	10/02/15	
	Define the requirements and charter for Integrated Process Control			
	Teams (IPCT) for specific waste streams, with a lead engineer and full			
14-7	set of SMEs (e.g., RCRA, Safety Basis, chemistry, Radiation	ADEP	10/02/15	
	Protection, Industrial Hygiene, CCP)			

On schedule

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### **JON 32: Procedure Development (ADEP)**

- <u>Conclusion</u>: LANS existing processes governing preparation, review, and approval of ADEP procedures did not contain sufficient guidance related to hazard analysis and subject matter expert review necessary to ensure safe, consistent, and compliant execution of waste processing
- JON 32: LANS needs to ensure that all procedures and procedure revisions contain:
  - The necessary level of detail to ensure the safe, consistent, and compliant performance of work, including process steps, materials, and material substitutions
  - Explicit requirements and criteria regarding inclusion of appropriate subject matter experts and their review and concurrence with new and revised procedures
  - Requirements that a Job Hazard Analysis (JHA) is appropriately amended when new activities such as nitrate salt remediation that could introduce new hazards are incorporated into existing processes
- <u>Approach</u>: Issue new procedure EP-AP-10007 "ADEP Technical Procedure Development" that addresses all elements of JON 32 and DOE/IG recommendations on ADEP procedure development

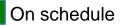
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### **JON 32 Corrective Actions**



32-1	<ul> <li>Develop, approve and issue new procedure to replace EP-DIR- AP-10007, "The Preparation, Review and Approval of ADEP Documents" to ensure that all ADEP technical procedures include:</li> <li>Necessary level of detail to ensure safe, consistent, and compliant performance of work, including process steps, materials, and material substitutions;</li> <li>Explicit requirements and criteria regarding inclusion of appropriate SMEs and their review and concurrence with new and revised procedures; and</li> <li>Requirements that a Hazard Analysis is appropriately amended when new activities such as nitrate salt remediation that could introduce new hazards are incorporated into existing processes.</li> </ul>	ADEP	8/14/15	
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# JON 13: Nitrate Salt Technical Basis (ADEP) Los Alamos

- <u>Conclusion</u>: LANS failed to provide sound technical basis for decisions regarding repackaging procedures and processes for the LA-MIN-02-V.001 waste stream
- JON 13: LANS needs to strengthen documentation to include a detailed technical basis to justify decisions made regarding change control for procedures and processes for the LA-MIN-02-V.001 waste stream
- <u>Approach</u>: Complete the technical basis actions for the LA-MIN02-V.001 waste stream. Implementation will follow the process established for JON 14.



JON	13 Corrective Actions	-	· Los A	lamo
13-1	Using LANL technical studies and analysis, along with technical input as derived from the Technical Assessment Team (TAT) Report, develop a summary document that describes our best understanding of the Remediated Nitrate Salt (RNS) Waste Stream	ADEP	9/18/15	ΔΤ.C
13-2	From the understanding derived in Action 1, develop a set of treatment options and evaluate their applicability to the RNS and Unremediated Nitrate Salts (UNS) waste streams using internal resources	ADEP	10/02/15	
13-3	Conduct a peer review of the treatment options report, to include assembly of an independent external team and direct interaction of the team with technical experts, and provide opinions and recommendations of the path forward for RNS/UNS salts	ADEP	9/02/15	
13-4	Develop a technical basis for storage and monitoring, to include analysis of the anticipated kinetics, as well as methods for temperature and headspace gas monitoring that will provide early warning	ADEP	11/06/15	
	(1) Develop an experimental test plan to determine the efficacy of treatment options for eliminating RCRA characteristics as they apply to		10/9/15	
13-5	RNS and UNS waste streams; (2) Report from Laboratories that will be used to establish path forward for removing RCRA characteristics,	ADEP	3/16/16	
	enabling a final disposal pathway; (3) Independent Review and National TRU Program concurrence on proposed path forward and	ADEP	4/15/16	
	facility choice for UNS and RNS Remediation; (4) DOE approval of proposed path forward and facility choice for UNS/RNS remediation		4/15/16	



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### JON 18: Understand, Mitigate Oxidation (ADEP)



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- <u>Conclusion</u>: Available data indicated that oxidation was occurring in the Standard Waste Box where sibling drum 68685 was stored, along with other similarly remediated waste drums
- JON 18: LANS needs to investigate and determine the cause for oxidation in sibling drum 68685 and take action to mitigate the condition as well as prevent future nitrate salt bearing waste drums (remediated and unremediated) from oxidizing.
- <u>Approach</u>: Utilize best technical information available to develop an approach to safe storage. Define measures and develop diagnostic methods to provide early warning regarding thermal runaway, and determine actions to take in the event of such warnings.

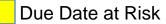




### **JON 18 Corrective Actions**

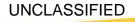
18-1	Sample headspace gas from 68685 and other RNS containers and trend data	ADEP	7/13/15	
18-2	Analyze data, develop models, and interpret results	ADEP	7/13/15	
18-3	Establish control methods for mitigating and inhibiting oxidation	ADEP	7/13/15	
18-4	Implement supplemental cooling inside the Dome 375 Permacon to mitigate and inhibit oxidation in RNS containers	ADEP	8/03/15	
18-5	Develop methods for temperature and headspace gas monitoring that will provide early warning	ADEP	11/06/15	

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### JONs 9 & 10: Secondary Waste, Requirements Flow-down (ADESH)

- <u>Conclusion</u>: LANS did not adequately evaluate the impact on the WIPP Waste Acceptance Criteria or effectively control the addition of secondary job waste into TRU waste containers
- <u>JON 9</u>: LANS needs to improve the level of rigor in evaluating and controlling addition of secondary waste into TRU waste containers
- <u>Conclusion</u>: LANS did not adequately incorporate upper tier requirements into development of repackaging at WCRRF (specifics focus on CBFO requirements and LANL RCRA permit requirements)
- JON 10: LANS needs to strengthen flow down of upper tier requirements into implementing procedures so that work is compliant
- <u>Approach</u>: Address gap in institutional waste management policy for specific guidance on secondary waste, neutralization, absorption, and incompatible materials.



### **JONs 9/10 Corrective Actions**



9/10-1	Revise, approve, and issue three key LANL waste management and environmental protection documents to strengthen and verify requirements flow down through active line management and SME involvement for a) secondary waste requirements criteria and when SME reviews are required; b) criteria for when waste characterization, compatibility and processing reviews are required; c) definition of neutralization and absorption; d) Hazardous Waste Facility Permit (HWFP) modification process; e) changes in waste processing; and f) RCRA, WAC and HWFP requirements	ADESH	11/13/15	
9/10-2	Evaluate and modify qualification standards, as appropriate, for Waste Management Coordinators (WMCs) and Deployed Environmental Professionals (DEPs)	ADESH	8/27/15	
9/10-3	Revise training for WMC, DEPs, and Designated ADEP personnel (e.g. waste operators and process engineers) on RCRA requirements to include a) secondary waste segregation requirements or the need to conduct compatibility evaluations; b) understanding of what constitutes waste processing and treatment; and c) what steps are required to ensure compliance with the HWFP	ADESH	10/22/15	
9/10-4	Augment Treatment, Storage, and Disposal Facility (TSDF) inspector training with development of qualifications for RCRA TSDF inspections to include field application of inspection criteria	ADESH	2/26/16	
9/10-5	Develop, approve and issue ENV-CP-AP-200, Regulatory Review of Waste Management Procedures, that defines ENV-CP procedure review requirements to include a) RCRA secondary waste requirements; b) evaluation of waste management procedure compliance with RCRA and HWFP requirements; and c) signature line for SMEs	ADESH	8/03/15	

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## **After CAP is Implemented**

- Systemic issues in ADEP Waste Processing corrected
  - Process change control and sound technical basis
  - Configuration management of processes and materials
  - Procedure development incorporates all requirements (SMEs)
  - Training/qualification in place for all positions
  - Safety culture fully embraced by managers and employees
- Compliant nuclear safety and RCRA programs
- Strong and continuous oversight by managers, FOD and LANL institution



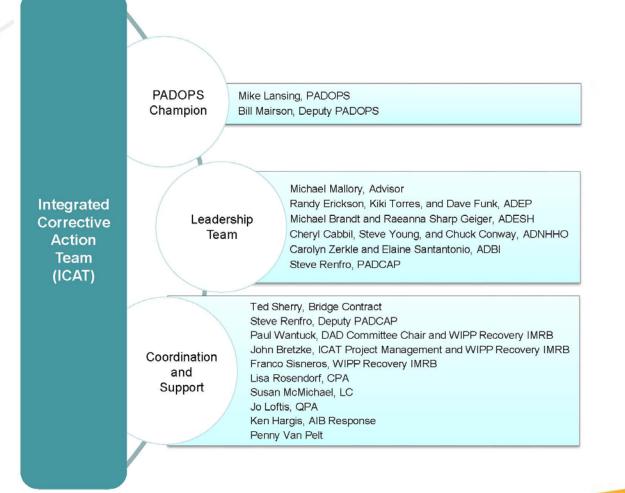
# **Backup Slides**



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### **Integrated Corrective Actions Team**



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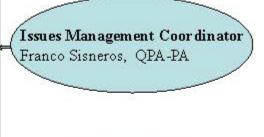


### WIPP Recovery IMRB (WR-IMRB)

Executive Secretary John Bretzke, GS-PSO WR-IMRB Advisors Larry Lucero, PAD STE Jim Faulkner, QPA-IQ

### WR-IMRB Members: Deputy Associate Directors and AD Representatives\*

Paul Wantuck, ADE, WR-IMRB Chair Elaine Santantonio, ADBI Kiki Torres and David Funk, ADEP Raeanna Sharp-Geiger, ADESH Kurt Schoenberg, ADEPS Paul Dotson, ADTSC Jim Jones, ADPM Evelyn Mullen, ADTIR Tim George, ADPSM Derrick Montoya, ADW Michael Bernardin, ADX Toni Taylor and Mark McCleskey\*, ADCLES Jeff Dare\*, ADSSER Derek Gordon and Steve Young, ADNHHO



**Logistics** Martha Buksa, QPA-DO Charlotte Lindsey, ADBI





### JON 39: ISMS/Safety Culture (DEP DIR)

- <u>Conclusions</u>: LANS allowed the safety culture at LANL to deteriorate within pockets of the organization
- Management failed to effectively respond to workers' issues regarding unexpected conditions.

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

- JON 39: LANS and NA-LA need to develop and implement more rigorous, effective integrated safety management system that embraces and implements the attributes of DOE G 450.4-1C, Integrated Safety Management Guide
- <u>Approach</u>: Identify and address gaps in implementation of the Laboratory's ISM program within specific areas of ADEP waste receipt, processing/ treatment, loading, and storage



### **JON 39 Corrective Actions**



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39-4	Implement approved project plan	ADESH	2/15/16	
39-3	Develop a project plan to address gaps in safety culture (DOE G 450.4-1C, <i>Integrated Safety Management Guide</i> ) identified in Action 39-2	DEP DIR	12/01/15	
39-2	Identify gaps in safety culture using DOE G 450.4-1C, <i>Integrated Safety Management</i> Guide, and LANL ISM framework within ADEP/EWMO and applicable organizations involved in the ADEP receipt, processing/ treatment, loading , and storage of waste	DEP DIR	8/03/15	
39-1	Reorganize ADEP, ADESH, and ADNHHO-EWMO to separate regulatory, program, line, and FOD functions and provide appropriate checks and balance between the functions; clarify R2A2; and assign new managers; establish Quality Assurance Manager position; deploy quality assurance and issues management personnel to ADEP from ADBI	ADEP ADESH ADNHHO	8/14/15	



### JONs 19, 20, 21: Safety Basis (ADNHHO)



- <u>Conclusion</u>: The WCRRF Basis for Interim Operation (BIO) did not thoroughly describe or evaluate nitrate salt processing or waste storage activities.
- JON 19: The WCRRF BIO needs to be revised to include more specificity in description of nitrate salt waste processing activities and then update the hazard analysis to include identification of all hazards and their evaluations.
- JON 20: LANS needs to review the Area G BIO in light of changes made to the WCRRF BIO and update accordingly.
- <u>JON 21:</u> LANS needs to conduct an extent of condition review for issues that are similar to nitrate salt bearing waste processing in WCRRF and Area G.
- <u>Approach</u>: Develop and submit a Page Change to WCRRF BIO to correct statements regarding nitrate salts. After technical basis is developed for treatment of RNS and UNS nitrate salts, submit Page Change to WCRRF BIO that addresses treatment. Evaluate Area G BIO based on changes to WCRRF BIO and develop/submit Page Change if appropriate. Conduct independent safety basis review to provide assurance that operations/activities described in WCRRF, Area G, and RANT BIO/TSRs are safe and compliant with current facility basis. Upon completion of review, submit applicable page changes as required.





### JONs 19, 20, 21 Corrective Actions

19-1	Submit WCRRF BIO Rev 3.1 Page Change to NNSA revising Ch. 2 and 3 to correct statements regarding nitrate salts and other oxidizers and include a statement in Ch. 3 regarding the potential presence of liquids in TRU waste streams	ADNHHO	7/30/15	
19-2	Submit WCRRF BIO/TSR Page Change to Safety Basis Approval Authority addressing treatment of remediated and un-remediated nitrate salt drums	ADNHHO	4/29/16	
20-1	Upon submittal of WCCRF BIO/TSR, Rev. 3.1 evaluate Area G BIO/TSR for applicable Page Changes	ADNHHO	8/31/15	
20-2	Contingent on results of Action 20-1, develop Page Changes to Area G BIO/TSR	ADNHHO	9/30/15	
20-3	Submit Area G BIO/TSR Page Change to Safety Basis Approval Authority addressing cold safing and de-nesting of remediated nitrate salt containers	ADNHHO	1/29/16	
21-1	Conduct Safety and Compliance Review per Safety Basis Procedure SPB-15-351, <i>Design Basis or Safety Basis Change</i> <i>Review,</i> on WCCRF, Area G, and RANT processes described in Chapter 2 of BIOs	ADNHHO	11/30/15	

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### JONs 15,16,17: WCRRF Glovebox Procedure (ADEP)



- <u>Conclusion</u>: LANS failed to ensure that there was sufficient detail provided in the WCRRF glovebox procedure to ensure safe, consistent, and compliant repackaging of waste and accurate documentation of the contents of the waste drums in the records.
- JON 15: LANS needs to revise the WCRRF glovebox operations procedure to contain the necessary level of detail to ensure safe, consistent, and compliant remediation of nitrate salt bearing waste.
- JON 16: The glovebox operations procedure needs to be revised to require operators to document critical process steps in a quality record, e.g., initial pH, absorbent added, neutralizer used, adjusted pH.
- <u>JON 17</u>: Operators need to be adequately trained on the revised glovebox operations procedure.
- <u>Approach</u>: Revise glovebox procedures for nitrate salt waste to include necessary level of detail and document key process steps in quality record. Corrective actions for JONs 9, 10, 13, 14, 19, 22, 23, & 32 are predecessor actions. (There are likely precursors from other CAPs as well.)







### JONs 15, 16 & 17 Corrective Actions

	(1) Revise, approve, and issue glovebox (GB) procedure for nitrate salt waste (separate procedure for each waste stream) to include		7/23/16	
15/16-1	necessary level of detail to ensure safe, consistent, and compliant remediation of nitrate salt waste, and document key process steps in a quality record; (2) Independent review and National TRU Program	ADEP	8/23/16	
	approval of procedure to implement UNS/RNS remediation; (3) DOE approval of procedure to implement UNS/RNS remediation.		8/23/16	
17-1	Develop and implement training on GB procedure for each nitrate salt waste stream in accordance with P781-1, <i>Conduct of Training</i>	ADEP	7/23/16	





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### JON 38: Operator and Supervisor Training & Qualification (ADEP)

- <u>Conclusion</u>: EnergySolutions, LLC (ES) operators and supervisors were not adequately trained and qualified to process waste with regard to identification and control of incompatible materials
- JON 38: LANS needs to evaluate and strengthen the operator and supervisor training programs of LANS and their subcontractors to ensure adequate understanding of basic chemistry interactions and associated controls.
- <u>Approach</u>: Conduct organizational profile for Waste Disposition Division (WDD) within Environmental Programs; establish appropriate positions; through analysis, develop training plans for positions and update Training Implementation Matrix (TIM).



### **JON 38 Corrective Actions**

38-1	Review, modify and update WDD position descriptions within Environmental Programs to include position description summary, job knowledge, education, and work direction components of the position	ADEP	7/17/16	
38-2	Develop, based on analysis, training and qualification programs for WDD positions within Environmental Programs in accordance with P781-1, <i>Conduct of</i> Training, that meet the requirements in DOE Order 426.2, <i>Personnel Selection, Training, Qualification, and</i> <i>Certification Requirements for DOE Nuclear</i> Facilities, and that address specific training and qualification requirements of each position, including positions that require training and qualification related to chemistry.	ADEP	9/09/16	
38-3	Revise TIM for WDD positions based on analysis from actions 38-1 and 38-2	ADEP	9/30/16	
38-4	Clarify the oversight role of LANS with regard to Subcontractor training and qualification for waste processing (JON 25 Actions 25-4, 25-5, 25-6, and 25-7)			

On schedule



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### JONs 22 and 23: USQ (ADNHHO)

- <u>Conclusion</u>: The LANS Unreviewed Safety Question (USQ) process was ineffective in ensuring that important procedure changes related to processing of nitrate salts were adequately evaluated for impacts to the safety basis.
- <u>JON 22</u>: LANS needs to ensure that USQ evaluators are organizationally independent of line management.
- <u>JON 23:</u> LANS needs to conduct retraining of USQ process evaluators/ approvers focused on implementation of the USQD process consistent with DOE Guide 424.1-1B, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*.
- <u>Approach</u>: Locate USQ evaluators in Safety Basis and Engineering Services organizations that are independent of ADEP line management. Utilize independent Senior Analyst Review for review of all USQ documents. Develop and deliver USQ training and facility specific training on Hazards and Accident Analysis and Technical Safety Requirements (TSRs) to USQ Qualified Evaluators.





### **JONs 22 and 23 Corrective Actions**

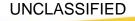
22-1	Formalize Senior Analyst Review for all USQ documents and develop a procedure to replace the existing Standing Order	ADNHHO	8/31/15	
23-1	(1) Revise and (2) implement USQ initial and refresher/continuing training.	ADNHHO	10/30/15 5/29/16	
23-2	(1) Develop and (2) implement facility-specific training on Hazards and Accident Analysis and TSRs.	ADNHHO	10/30/15 5/29/16	



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### **JON 25: Contractor Assurance / QA**

- <u>Conclusion</u>: The Los Alamos National Security, LLC (LANS) contractor assurance system was not effective in identifying weaknesses in the process for developing/changing procedures, analyzing and controlling hazards, performing work to repackage nitrate salt bearing wastes, and feedback mechanisms which resulted in the production and shipping of noncompliant waste drums to WIPP and Waste Control Specialists, LLC.
- JON 25: LANS needs to develop and implement a fully integrated contractor assurance system that provides DOE and LANS confidence that work is performed compliantly, risks are identified, and control systems are effective and efficient. (Specific areas focus on TRU waste operations)

### Approach:

- 1. Assess and improve the Contractor Assurance System (CAS) for Environmental Programs Waste Processing;
- 2. Assess and improve the oversight roles of LANS with regard to subcontractors doing Waste Processing work; and
- 3. Assess and improve the Quality Assurance program for Waste Processing work, including review of rigor in implementation of the change control process (JON 14), requirements flow down process, including P409, *Waste Management* (JONs 9/10), and responding to operations feedback by LANS senior management (JON 39).



### **JON 25 Corrective Actions**

			<u> </u>	
25-1	Assessment of the formal aspects of the CAS as described in SD 320 (rev 3) within ADEP/EWMO and applicable organizations involved in processing and packaging of waste. CAS findings identified in the AIB report will be addressed	QPA	8/21/15	
25-2	Develop project plan to address identified gaps in CAS elements (per assessment above)	QPA	8/28/15	
25-3	Implement approved project plan	QPA	5/31/16	
25-4	Assess ASM Contractor and Subcontractor requirements in regard to oversight role to include R2A2s for ADEP and EWMO	ASM	8/21/15	
25-5	Develop project plan to close gaps in detailing and improving contractor requirements identified in assessment	ASM	8/28/15	
25-6	Implement approved project plan	ASM	5/31/16	
25-7	Modify the existing STR refresher training to emphasize that technical changes to the subcontract and changes to the scope of work require a review and concurrence by applicable SMEs and other stakeholders and that such changes and reviews are documented and included in the STR subcontract administration file	ASM	10/30/16	
25-8	Assessment of the formal aspects of the Quality Assurance program to the scope of activities to which the ADEP QA program is applied to ensure that regulatory, statutory, and contractual QA requirements that are applicable to those activities are applied to those activities. This activity includes providing institutional QA personnel to ADEP	QPA	8/21/15	
25-9	Develop project plan to address identified gaps in Quality Assurance	QPA	9/24/15	
25-10	Implement approved project plan.	QPA	5/31/16	

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